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NEUROLOGY AND PSYCHOPATHOLOGY.

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THE JOURNAL OF NEUROLOGY AND (PSYCHOPATHOLOGY)

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VIII

THE JOURNAL OF NEUROLOGY AND PSYCHOPATHOLOGY.

VOL. III.

MAY, 1922.

No. 9.

Original Papers.

ON CAUSALGIA AND ALLIED PAINFUL CONDITIONS DUE TO LESIONS OF PERIPHERAL NERVES.*

By H. S. CARTER, LEEDS.

This paper is based upon the personal examination of over one thousand individual cases of injuries to peripheral nerves during the past three years. The author also had the opportunity of investigating many more cases at various stages of their treatment and recovery. Altogether, more than five thousand routine observations have been made. In addition to this amount of neurological work, facilities have been available for the study of pathological and bacteriological conditions, and access to the operations and operation notes of the surgeons under whose care the cases were placed has been possible.

The work has been carried out at the Second Northern General Hospital, now the Ministry of Pensions Hospital, Leeds.

DEFINITION.

Causalgia (thermalgia) is an intensely painful condition almost entirely limited to certain sensory areas of the median and sciatic nerve distributions, and caused by lesions of these nerves at points more or less distant from these areas, and characterized by local

* This paper forms part of a thesis accepted for the degree of M.D. in the University of Leeds.

vasomotor disturbances and general hypersensitiveness of the nervous system: a painful vasomotor neurosis due to irritation of a mixed nerve. Most of the cases seen and on record have been due to gunshot wounds, but very occasionally the condition is found in civil life.

The less painful conditions which are discussed along with true causalgia are distinguishable in degree, but arise from similar causes and under similar circumstances.

HISTORICAL.

The first case on record was described by Denmark in 1813. The patient was a soldier wounded at Badajoz by a bullet which entered the arm above the inner condyle of the humerus and came out on the outer side of the arm in front of the elbow-joint. Denmark described the state of affairs as follows:—

“I always found him with the forearm bent and in supine position, and supported by the firm grasp of the other hand. The pain was of a ‘burning’ nature, and so violent as to cause a continual perspiration from his face. He had an excoriation on the palm from which exuded an ichorous discharge.”

Hamilton, in 1838, stated in reference to a case, that:—

“The pain may be accompanied by redness and swelling resembling the appearance of the skin in inflammation of the fascia or a deep collection of matter.”

Paget, in 1864, drew attention to pain and vasomotor disturbances occurring as symptoms of incomplete physiological and anatomical division of nerves, and described the conditions as follows:—

“Glossy fingers appear to be a sign of peculiarly impaired nutrition and circulation due to the injury of nerves, and I cannot tell what are the peculiar conditions of the cases in which they are found: but they are a very notable sign, and are always associated, I think, with distressing pain and disability. In well-marked cases the fingers which are affected are usually tapering, smooth, hairless, almost devoid of wrinkles, glossy, pink or ruddy, or blotched, as if with permanent chilblains. They are commonly also painful, especially on motion, and the pain often extends from them up the arm.”

In the same year, 1864, Weir Mitchell, Moorhouse, and Keen (*Gunshot Wounds and Other Injuries of Nerves*) wrote of it as a rare disease, coined the name ‘causalgia’ from two Greek words meaning ‘pain’ and ‘heat’, on account of the burning pain which is the outstanding symptom, and made the first complete and classical description of the condition. Weir Mitchell states in reference to cases which occurred during the American Civil War:—

“The skin affected in these cases was deep red or mottled, and red and

pale in patches. The subcuticular tissues were nearly all shrunken, and, where the palm alone was attacked, the part so diseased seemed to be a little depressed, firmer, and less elastic than common. In the fingers there were often cracks in the altered skin, and the integuments presented the appearance of being tightly drawn over the subjacent tissues. The surface of all the affected parts was glossy and shiny as though it had been skilfully varnished. Nothing more curious than these red and shining tissues can be conceived of. In most of them the part was devoid of wrinkles and perfectly free from hair. Mr. Paget's comparison of chilblains is one we often use to describe these appearances, but in some instances we have been more strikingly reminded of the characters of certain large thin and polished scars."

Later, Weir Mitchell says :-

"Further study led us to suspect that the irritation of a nerve at the point of the wound might give rise to changes in the circulation and nutrition of the parts in its distribution, and that these alterations might be of themselves of a pain-producing nature."

It is probable that Weir Mitchell included in the term *causalgia* painful conditions arising from vascular injury associated with injuries of peripheral nerves, as well as those cases of *causalgia* due to lesions of the trunks of the median nerve and internal popliteal branch of the sciatic nerve.

In the forty years following Weir Mitchell's observations, years of comparative freedom from war on a large scale, little or nothing was added to our knowledge. In 1908, after the Boer War, Sherren, in his book on *Injuries of Nerves and their Treatment*, reviewed the earlier literature of the subject, and presented descriptions of cases occurring in civil life as a result of penetrating wounds and primary injuries associated with fractures or direct trauma, as well as those due to war injuries. He described also, what had not been emphasized before, the operative findings of incomplete division and searing around the nerves. He writes :—

"It (*causalgia*) occurs most often in gunshot wounds with delayed union, but in several cases which have come under my care the wounds healed by first intention, and it may occur as a complication of subcutaneous injury."

The late war with Germany provided much more material for observation; and the more systematic examination and recording, particularly in relation to the French Armies, where *causalgia* as a result of nerve injuries seems to be much more frequent in its most pronounced form than among the British Armies, have resulted in the reappearance of descriptions in the literature and a revival of interest in the condition. Modern warfare, with the vast numbers of wounds caused by irregular projectiles, provides peculiarly appropriate opportunities for the frequent causation of incomplete division of nerves and large scar-formation in the neighbourhood of nerve-trunks.

METHODS OF EXAMINATION OF CASES.

As a rule, in cases of major causalgia, the patient's limb is much too painful, and the patient himself is much too apprehensive, for anything more than a perfunctory examination of sensory changes to be carried out. The patient is intolerant of the lightest touch or jarring of the injured member; the emotional condition is such as to make his answers to questions unreliable; and even where it is possible to conduct a superficial examination, perception fatigue occurs very rapidly and vitiates the results. This difficulty no doubt accounts for cases published in which it is stated there are no sensory changes. In all the cases observed and recorded in this paper there were definite sensory changes in the peripheral distribution of the nerves affected, although in all cases the observations were made with great difficulty, two or three interviews with the patient being needed before any sensory chart could be made.

In the less severe cases, examination is more possible, and the methods used were, in effect, those employed by Head and Sherren in their classical experiments (*see also* Burrow and Carter, *British Medical Journal*, Nov. 16, 1918). Space forbids their recapitulation.

CLINICAL CONSIDERATION OF CASES.

TYPES OF LESIONS.

There were five varieties of clinical types recognized during this investigation of painful conditions caused by lesions of peripheral nerves.

1. *The Syndrome of Slight Nerve Irritation*, in which there was little or no pain when the limb was at rest, but where the interference with the nerve was manifested by altered quality of sensation (paræsthesia) in the peripheral distribution of the nerves. The sensory changes were, however, usually very slight. In these cases there were no marked trophic changes and no contracture, and little loss of function. They recovered quickly with suitable physiotherapeutic treatment.

2. *The Syndrome of Irritation of Mild Neuralgic Nature*, in which the pain was of an aching character along the course of the nerve and round the site of injury. In these cases also there was often a little paræsthesia in the peripheral domain supplied by the nerve, but sensory changes were almost negligible. There was little loss of function and no contracture or trophic changes, and the cases recovered rapidly with suitable treatment.

These two types may be found in relation to injuries of any peripheral nerves, and not especially in injuries of those mixed nerves possessing a large number of vasomotor and trophic fibres, irritation of which produces the profound disturbances seen in causalgia.

3. *The Syndrome of Severe Nerve Irritation*, found only in lesions of mixed nerves which contain numerous vasomotor and trophic fibres. Pain was the chief characteristic of these cases—intensified by warmth and also by cold. There was also cutaneous hyperaesthesia in the peripheral distribution of the nerve, and also in some cases there was some cutaneous anaesthesia to light touch. Deep pressure-pain sense was preserved and exaggerated. These cases seemed to be intimately allied with true causalgia in presenting the whole gamut of trophic changes found in the latter. Considerable loss of function was present. They resisted treatment.

4. *The Syndrome of Irritation of Severe Neuralgic Nature*, characterized by intense aching pain along the nerve and in the muscles supplied by the nerve and in the peripheral distribution of the nerve. These cases were mostly limited to the median and sciatic nerves. Trophic changes were not so marked in these cases. The pain varied in intensity, but was always enough to cause reduction of the capacity for function of the limb. Sensory changes were always present.

Types 3 and 4 are classified as minor causalgia.

5. *The Syndrome of True Causalgia*.—This occurred always in injuries of the median or sciatic trunks, or of the inner cord of the brachial plexus which seems to carry those fibres, injury of which causes the typical 'burning' pain characteristic of this disorder. In these cases, whilst their outstanding feature was the intense pain, the whole of the symptom-complexes of the previous two varieties were associated. A good deal of sensory disturbance was always present. These cases were found to be resistant to most forms of treatment.

These last three types classified as minor and major causalgia are the types illustrated in this paper. Strictly speaking, the presence of an area of impaired sensation indicates a neuritis rather than a neuralgia. In all the cases considered there were sensory changes.

INCIDENCE OF CASES.

The 23 war cases described occurred among about 3000 cases of peripheral-nerve injury of more or less severity. The incidence therefore was 1 in 130. True major causalgia was much rarer—about 1 in 750 cases. From the literature, severe causalgia seems to have been more common in the French Armies. Possibly the more emotional character of the race has had something to do with the greater prominence of mental and emotional symptoms recorded by foreign contributors in their cases.

The incidence of causalgia in civil practice is small. One case only is described (*Case 3*).

CLINICAL DESCRIPTION OF CASES.

Case 2.—Pte. D., age 26, A.S.C. Patient wounded in the region of the right knee and along the outer border of the popliteal space, Aug. 27, 1917. His foot dropped immediately he was hit, but he had no pain. Operated upon at Boulogne, and bullet removed from the left leg, where it had lodged after traversing the right. About a fortnight later he began to have pain in the foot, chiefly in the sole. Sent to England, where, he says, the external popliteal nerve was sutured October, 1917 (there is much doubt about this). The pain got worse, and he became unable to bear his foot on the ground. For the next year he wandered from hospital to hospital, but had very little treatment except massage and interrupted galvanism, which did not relieve him. The pain was continuous, and was intensified by efforts to walk or any sudden movement. He found the pain located itself chiefly on the inner side of the sole of the foot, although there was some aching of the dorsum. He found it much worse in warm dry weather and much relieved in rainy weather. He says, "I feel as though I could walk miles in a nice steady rain."

He described the pain as a continual intense aching pain—on the sole 'burning' in nature, and on the dorsum like toothache.

CONDITION DECEMBER, 1918. The patient is a little thin, nervous-looking man, with a scared, apprehensive expression. He has come for examination in a chair, although he can walk with the aid of crutches, and does so with the knee flexed and the foot clear of the ground. The leg is wasted from the knee downwards. The knee-joint is movable, but painful when moved. There is drop-foot with some inversion. There is a large fibrous scar over the outer side of the knee and across the popliteal space. Palpation and percussion of this cause referred tingling in the foot and exacerbation of the continuous burning pain in the sole of which he complains. All the muscles supplied by both external and internal popliteal nerves have a degree of voluntary power. Pressure and percussion over the line of the internal popliteal and posterior tibial nerves cause spasms of pain in the sole.

He is extremely intolerant of the slightest movement of the limb, and is emotional to tears when examination is attempted.

The whole foot appears to have lost character. The skin is dead-looking, especially on the sole: the nails are dull and brittle: there is some branny desquamation over the dorsum of the great toe. On the sole of the affected foot there is less furrowing than on the normal sole, and the skin on the inner side looks particularly sodden and dead. There is a tendency to sweating. The toes are fallen together (weakness of interossei), so that the whole sole looks smaller and more compact than the normal left sole.

The sole is intensely painful to even the lightest touch. The slightest stimulation causes starting and drawing back of the foot. The most intensely painful area is in the internal plantar region. Sudden firm grip is tolerated well after the initial spasm due to superficial stimulation has passed off.

On the dorsum of the foot below the external malleolus there is a less painful area, and elsewhere there is paresthesia to light touch.

SENSORY EXAMINATION.—Weber's compass-point test gives the following results:—

With the foot at room temperature, 54°, 4 cm. between compass

points: Normal left sole $\frac{1}{2} \frac{11111}{22222}$: all correctly identified. Causalgic right sole $\frac{1}{2} \frac{111 \times}{22 \frac{2}{2} \frac{2}{2} \frac{2}{2}}$: 33 per cent wrongly identified.

With the foot cooled and adapted to 45°, 4 cm. between compass points: Causalgic right sole, $\frac{1}{2} \frac{1}{22} \frac{111}{2 \frac{2}{2}}$: 27.3 per cent wrongly identified. Cooling diminishes the inaccuracy a little.

Sensation of roughness tested with Graham Brown aesthesiometer: Normal sole, 2. The threshold is higher on the affected side. Causalgic sole, 2.5.

ELECTRICAL EXAMINATION.—All the muscles supplied by both external and internal popliteal nerves responded to faradism, but they required more current than normally, and the contractions were sluggish. To galvanic stimulation the long muscles responded well, K.C.C. just = A.C.C., with fairly sharp contractions. The small muscles (flexor brevis digitorum and small muscles of the foot) react sluggishly, and there is polar reversal, i.e., A.C.C. > K.C.C. There is no reaction of degeneration, however.

SURGICAL PROCEDURE.—Operation was performed Dec. 12, 1918. An incision was made along the course of the internal popliteal nerve from the popliteal space to mid-calf. Both internal and external popliteal nerves were found to be involved in very extensive adherent scar tissue. The external popliteal nerve in one place was found adherent to the skin. Faradic current directly applied to the bared nerves showed by contraction of their supplied muscles that both conducted stimuli. Careful dissection of the nerves from scar tissue was attempted, but the scarring in and on the nerves was so extensive that it was impossible to free them entirely. The wound was closed.

This operation made not the slightest difference to the intense pain, and the wound suppurated in forty-eight hours.

A month later, the sepsis having settled down, but the pain being as bad as ever, the internal popliteal nerve was divided and left so, with a view to relieving the pain immediately. Resection and suture was to be done later, when patient's condition improved: but he was so much better and had so little pain after division of the nerve that he refused further interference.

POST-OPERATIVE EXAMINATION.—The pain did not disappear altogether, although it was very much diminished, but a few months later, in May, 1919, all the external popliteal muscles were acting and responding to faradism. All internal popliteal muscles were out of action. There was full sensory loss in the internal popliteal area, with loss of deep sensibility. The burning pain had vanished, although in the external popliteal area there was still some aching and paræsthesia.

He was given anodal galvanism for the external popliteal neuralgia, with good results.

EXAMINATION ONE YEAR LATER.—There is no burning pain now, although there is a certain amount of pins-and-needles tingling on jarring of the sole, and some paræsthesia also in the external popliteal area. The whole picture now is insignificant. All internal popliteal-supplied muscles are paralysed: all external popliteal-supplied muscles are working. There are some small dry pressure sores on the great toe.

Patient says he eats well and sleeps well, has gained weight, and is working as a tram conductor and gets along very well. His personal

appearance is vastly different from the nervous apprehensive state of the painful period.

Case 3.—This case of median causalgia in a woman, with pain of about seven years' duration, the writer was privileged to see by courtesy of Dr. J. le F. Burrow. As the patient was only seen once, an incomplete examination was made.

Mrs. W., age about 60, had suffered for seven years from a burning pain in the left palm and median-supplied fingers. The pain started after an attack of cholelithiasis, and was first felt as a burning pain along the radial margin of the thumb midway between the palmar and dorsal surfaces. It rapidly became worse, and was much increased by touching any object or using the hand in any way. The patient could not bear hot- or cold-water applications, and hot fomentations increased the pain. The skin of the affected hand became pink, and the fingers soon showed a tendency to become conical. Small scattered pin-head vesicles would arise under the skin, and larger blebs would arise suddenly in a few hours quite spontaneously, there being no question of trauma. The pain became so intense, and interfered so much with her daily work and her sleep, that she sought treatment.

For some time she was treated with local applications and with anodal galvanism, but without relief. There was pain on pressure and percussion over the line of the median nerve up to $1\frac{1}{2}$ in. above the elbow.

In November, 1917, alcohol was injected into the nerve in the upper arm. The relief was only temporary. The pain returned, and the skin over the bony prominences of the median-supplied fingers became thin and glossy.

In March, 1918, alcohol was again injected. Again the relief was only temporary.

In October, 1918, the nerve was divided and immediately re-sutured. In less than a month the pain made its appearance again.

In November, 1918, the nerve was again divided higher up in the arm and sutured. After this operation there was considerable diminution in the pain, and when the patient was seen early in 1919 it was limited to the index finger and the thumb. It is by no means as severe as it was, and is comforted by a simple woollen covering.

About this time the patient was put upon anodal galvanic baths, which certainly tended to relieve the condition.

This painful lesion of the median nerve is said to have been due to gouty deposits in the nerve. If this is so, then there must be irritation of the sympathetic fibres at a higher level than that at which the nerve was divided, to account for some persistence of symptoms. Following this argument it would seem that division higher up still might have abolished the pain altogether for a time, but in any case the pain would be very likely to recur with regeneration of the nerve, for ablation of a string of sclerosed patches due to localized deposits is impossible without rendering the nerve incapable of repair. Probably general treatment directed at the underlying condition, combined with local sedative treatment and lapse of time, promise better permanent results than surgical intervention, which, however,

is valuable because it promises at any rate temporary relief from pain. Higher division has not been carried out, and the patient remains with a certain amount of pain and a recovering median nerve, with paræsthesia in its peripheral distribution.

This is an example of a prolonged and intense causalgia apart from mechanical trauma of the nerve. The writer has also seen a case of persistent aching pain in the balls of both thumbs, with wasting of both sets of thenar muscles, in an old woman of 70, who sustained Colles's fractures of both wrists earlier in life. In this case there was not a great deal of disability, although the constant aching pain interfered with sleep, especially in warm weather. The pain did not arise for years after the fractures, and perhaps was attributable to the advance in fibrosis of old age, with nerve pressure in the regions of the ancient fractures.

Case 4. Pte. E. V. H., age 24, 1 20 London Unit. He received bullet wounds of the left forearm on Sept. 15, 1916. There was no fracture. Admitted to hospital on Sept. 22, 1916. On Sept. 28 he had a severe hæmorrhage from the arm wounds. On incision it was found that bleeding came from the bifurcation of the brachial artery. The brachial artery was ligated, as were also the radial and ulnar arteries below. Up to this time he had complained very little of pain in the hand, although he stated that pain was present and that it became much worse after the operation. On Sept. 30 the pain was getting unbearable: it was situated in the median area of the palm of the hand, and was of an intense burning nature. The patient's appearance also suggested pain. His expression of anxiety and apprehension, and the attitude of the injured limb, were typical of the gravity of the disorder. The pain continued, and increased in intensity. The hand began to assume the typical causalgic appearance, with trophic changes and contracture. The hand was too painful to examine properly. The patient's mental condition became perverted and his manner strange. He carried a wet rag about constantly in the left hand, because, he said, it relieved the burning pain. Heat, noises, or sudden jarring produced paroxysmal exacerbation.

Early in December, 1916, he was pronounced by a physician as being "mentally deficient (mild degree), which accounts for his rather peculiar manner". It was not thought that he had any nerve injury of importance. There was little or no wasting of muscles, and he had a degree of power in them all. The painful palm was painted with a mixture containing menthol, chloral, and camphor.

Dec. 12. Definite interference with the left median nerve was diagnosed, and it was found that the flexor longus pollicis and the small median-supplied muscles did not respond to faradic stimulation. There was no reaction of degeneration.

OPERATION. Dec. 21. The median nerve was found to be apparently only slightly involved in scar tissue. It was freed and the wound closed. For a little while after this there was some amelioration of the pain, but only for a few days. The application of diathermy was now tried over the scar area, and the arm was put up on a splint with a moist pad in the palm. Contracture was commencing.

SENSORY EXAMINATION.—The sensory disturbances were those typically found in median causalgia. There was no total loss to light touch.

ELECTRICAL EXAMINATION.—There was faradic response in every median muscle a few months after the neurolysis.

In view of these findings further operation was postponed, but improvement under treatment by diathermy and paraffin baths was not maintained, and his mental and emotional state was as bad as ever. The pain was rapidly becoming intolerable again.

SECOND OPERATION.—March 4, 1918. The median nerve from a point 2 in. above the flexure of the elbow to $2\frac{1}{2}$ in. below was found involved in scar tissue, and the nerve itself was found to contain fibrous nodules over a length of $2\frac{1}{2}$ in. This portion was resected, and end-to-end suture was performed.

POST-OPERATIVE EXAMINATION.—A month later the median causalgia was cured. The pain had disappeared. The patient looked and felt a new man, and was not recognized by the physician who had formerly pronounced him mentally deficient. In June, 1918, he was invalided from the service. There was no return of pain, and the nerve was regenerating.

This was a severe case of median causalgia with associated mental change caused entirely by the intolerable pain in a suitable subject.

Details of the other cases of major causalgia are to be found in *Table I* at the end of this paper.

Case 6.—Pte. G. W., R.G.A. Shrapnel wound of the right upper arm, March 31, 1918. Patient stated that he felt the sudden pain of the wound at the time of the impact, but thereafter had no particular pain until that which developed in the hand ten days later. Since then it has been increasing in intensity, and is of a severe neuralgic type. When seen on June 19, 1918, the patient obviously had pain. He carried the right arm with the elbow flexed and the forearm pronated and held against the body. The hand was wrapped up in a wet cloth.

All the joints were found freely movable, and there was no paralysis of any muscle, although he was very chary of motion of any kind because of the pain. This, he said, varies in intensity, is always situated in the palm, and changes with the weather. It is much worse before rain and better after rain. Contrary to the state of affairs in major causalgia, it is very bad in cold and damp weather and much more comfortable on warm sunny days. Swinging the arm or allowing it to hang down whilst walking causes throbbing and bursting sensations in the hand, and sudden noises or bright lights cause exacerbation of the pain.

The skin of the palm was very pink in colour, and sodden with the continual contact with the wet rag. The fingers were conical and very pink; the nails were dull and arched. The whole median area and its overlap in the hand were painful to all forms of stimuli. There was commencing flexor contracture.

There was a good deal of interference with sensation, and much paraesthesia, but no total loss to light touch; considerable interference with discriminating sensibility. All the median muscles responded to faradic stimulation.

OPERATION.—On July 5, 1918, the ulnar and median nerves were exposed in the upper arm for 6 in. of their course. Both nerves were surrounded by scar tissue and were freed. No bulb or hardening of

the nerves was felt anywhere. Perfectly smooth and soft nerve-trunks. The scar tissue removed was not dense—just a soft matting together of structure. The vessels were freed for 3 in. Nerve section was not deemed advisable, and the wound was closed in the usual way.

POST-OPERATIVE EXAMINATION.—Sept. 4, 1918: The continuous pain had almost gone, but there was considerable hyperæsthesia to even light stimulation all over the median area. All the muscles were acting well, but there was a little contracture. The thenar muscles were painful to pinching. Deep pressure over the course of the nerve in the arm was painful, but caused no referred sensation.

Nov. 12, 1918: All muscles working well, but there was still some contracture. There was no pain, but a little 'douleur de pincement'.

This example of painful nerve lesion partakes more of the nature of *Types 3* and *4* than of true causalgia, although the pain was sufficiently severe to cause much disability and distress.

Details of the other cases of minor causalgia are to be found in *Table II*.

DIAGNOSIS AND DIFFERENTIAL DIAGNOSIS.

The recognition of the clinical picture of true causalgia is not difficult. The outstanding feature, of which the patient invariably complains, is the intense, smarting, burning pain. It is almost always median or sciatic nerve lesions that give rise to this syndrome. The violent pain is localized, in the case of the median nerve, chiefly in an area bounded by the base of the index and second fingers, the root of the thumb, and the middle of the palm; in the case of the sciatic to the internal popliteal area of distribution, and of this to about the middle third of the inner half of the sole, i.e., the middle third of the internal plantar area. From these areas of maximum intensity the pain radiates to other parts in the sensory distribution of the nerve involved. History usually reveals that the pain arose some time after the injury—from one to four weeks as a rule.

The pain is always greatly intensified in a spasmodic way by movements, sudden jarring, sudden noises, bright lights, emotion, and keen sensations. The painful areas are excessively hypersensitive to the lightest touch, and yet firm grasp is tolerated well; that is, pressure-pain sensibility is hardly disturbed, and the intense burning pain is referred only to the superficial integument. Exacerbations of the pain are frequent, and take the form of throbbing, bursting, agonizing spasms of horrible intensity, excited by the slightest stimuli.

Patients affected soon show the signs of anxiety and apprehension, and come to develop as much immobility as they can. If they walk, they do so very carefully to avoid shock. Heat and dryness intensify the pain, as also does the dependent position of the limb, so that patients always keep the arm up, or, if the leg is affected, have the

greatest reluctance to assume the erect position. There is a tendency to hold the whole limb in flexion. If patients are bedridden, the whole body may be held in a curled-up posture indicative of defence. Cold and moisture relieve the pain to some extent, and frequently subjects of this disorder carry, in the affected palm, wet rags which they keep continually moist. Sometimes they carry the wet rag or handkerchief in the sound hand, which may, indeed, become the seat of a certain amount of pain—suggestive of disturbed reflexes. One patient sought relief by bathing his hand in methylated spirit. Slowly evaporating lotions give temporary relief. Insomnia is common in these cases, owing to the pain.

Along with the pain which is the central feature of causalgia there are other disturbances. Sensation was disturbed in the areas of supply of the nerves affected in all the cases recorded in this paper, although Stopford has published cases in which he says there were no sensory changes. They may be easily overlooked owing to the extreme sensitiveness of the limb and the patients' reluctance to submit to any detailed handling.

Almost invariably there is no paralysis of muscles, but a paresis only, with electrical reactions which are only diminished and not altered in quality. Idiomuscular contractions are usually brisk. There is never reaction of degeneration. There is usually slight contracture. Involuntary movements and tremor may be noticeable.

Vasomotor and trophic disturbances are usually well marked. Early in the evolution of the case, the skin of the affected area becomes delicate-looking and flushed pink, and later becomes smooth, thin, and warm and red-looking. Glossy atrophic skin over the more bony parts is observed. Sometimes the affected palm or sole is dry and hot, but more often there is pronounced sweating, made worse by attention. The constant application of moisture causes a sodden, ground-glass appearance of the skin, and there is often delayed desquamation of epithelium. The fingers become attenuated and tapering towards their distal ends. There may be subcutaneous vesicles or blisters, which arise spontaneously without trauma (*Case 3*). The nails grow rapidly, become curved, ridged, and brittle, lose their gloss, and become yellowish in colour. There is usually overgrowth of the subungual tissue, which may be painful.

The mental and emotional conditions of these patients depend a good deal on their normal temperaments. The normally highly-strung neurotic individual soon shows signs of instability (*Case 4*), but the normally phlegmatic type will suffer untold agonies without much outward sign of loss of balance (*Case 5*).

In cases of causalgia which are cured or are well on the way to recovery, there sometimes persists hysterical exaggeration of residual

symptoms, including simulated pain and spasm of the muscles of the limb affected. Persistent phobias of this and similar types may exist for some time after the cure is complete, possibly owing to persistence of abnormal impulses carried by sympathetic channels reacting upon a sensitized nervous system. Such extreme cases are, as a rule, only seen in persons of emotional individuality.

Considerations of space forbid a detailed discussion of differential diagnosis. The following conditions may, however, have to be distinguished from major causalgia: (1) minor causalgia, (2) recovering nerve lesions with altered sensation and paræsthesia, (3) ischemic contracture (Volkmann), (4) physiopathic cases, (5) purely hysterical paralysis, (6) syringomyelia and Morvan's disease, (7) erythromelalgia, (8) polyneuritis, (9) tubercula dolorosa (multiple growths in the connective tissue of nerve-trunks), (10) focal lesions in the brain, with peripheral pain.

SUMMARY OF CONDITIONS OBSERVED IN CAUSALGIA AND ALLIED STATES.

1. Pain was present in all cases, varying in severity from the intense, intolerable burning pain of true major causalgia, to the dull, continuous, aching pain of the minor conditions.

2. Characteristic attitude, already described, of the affected limbs was observed in many cases, typically in the cases of major causalgia.

3. Motor disturbances were always noted, but there was never any absolute paralysis. There was always diminution of function.

4. Muscular atrophy was generally present, but was slight and much less marked than in total nerve lesions of similar duration.

5. Electrical reactions of muscles—these were always affected. Generally speaking, stronger currents were required to evoke contractions than normally.

6. Contracture of muscles was frequently observed, particularly in long-standing cases.

7. Vasomotor disturbances were present in all cases to a greater or less degree.

8. Sudomotor disturbances were frequently observed.

9. Trophic changes were always observed to be present to a greater or less degree, especially in regard to the nails, bones, and skin.

10. Sensory changes. Apart from the subjective disturbance manifest as pain, there were always objective sensory changes present, and limited to the more superficial varieties of sensibility.

11. Thermal symptoms. There was a certain amount of dissociation of thermal sensibility in most cases, although it was difficult to obtain information on this point. Patients, however, frequently

complained that the affected member felt hot and at times burning. Occasionally ordinary cool objects were felt as icy cold.

12. Involuntary movements were present in a few cases.

13. The tendon reflexes were usually a little brisker on the affected limb, but it was difficult to examine them in the severer cases. In no instance were they absent.

14. Mental and emotional instability was observed in the more severe cases, *Case 4* in particular.

PROGRESS OF UNRELIEVED CASES.

The intense pain, it was found, had a tendency to very gradual improvement, but in one instance it continued for years (*Case 3*). As a rule, in cases of twelve or eighteen months' duration, the pain had diminished considerably, but at considerable cost to the function of the limb. The power of voluntary movement improved very slowly with the pain, under suitable conditions; but frequently it became worse, and was complicated by a superimposed functional element. Atrophy of the hand or foot was progressive in untreated cases, until the member as a whole became smaller and more delicate-looking than the normal. Muscular contracture increased, arthritic changes occurred, and joints stiffened. The bones atrophied, the nails were coarsened and curled, the skin grew thin and glossy, the fingers spindle-like, and the whole hand or foot gradually became ischæmic, with fibrosis of muscles, assuming a claw-like character and ultimately developing into a painful, contracted, useless, deformed extremity (*Case 12*). Stopford has noted also that endarteritis of peripheral vessels occurs as an end-change in neglected cases. No opportunity for microscopic examination of arteries occurred in the cases studied. Trophic sores becoming gangrenous are prone to occur in a very few late cases. During the height of the pain the mental and emotional states of these patients become pitiful (*Case 4*). Thus the prognosis apart from suitable treatment is undoubtedly bad, and drastic measures are warranted without delay before the hand or foot becomes irrecoverably useless and before the intense pain has deranged the mentality of the individual.

PATHOGENESIS.

I.—ANATOMICAL AND PHYSIOLOGICAL CONSIDERATIONS.

In discussing the pathogenesis of causalgia and allied painful conditions due to lesions of peripheral nerves, one factor immediately obtrudes itself for examination, namely, that these intensely painful conditions occur only in injuries to the median and sciatic nerve-trunks, or to the higher origins of the median nerve-fibres in the brachial plexus, or to the internal popliteal or posterior tibial branches

of the sciatic trunk. It is necessary, then, to consider in what way these nerves differ from other nerves of the limbs. These differences are as follows :—

1. Both sciatic and median nerve-trunks possess and supply specialized peripheral areas in the sole of the foot and in the greater part of the palm of the hand.

2. These areas of supply contain in their skin the majority of the varieties of sensory nerve-endings and end-organs—the corpuscles of Meissner, the Pacinian corpuscles, Ruffini's and Golgi's end-organs, etc.

3. Both nerves also possess a larger number of vasomotor fibres for the elaborate vascular supply of the hand and foot (Kramer and Todd, Potts). Section of the sciatic nerve causes active dilatation of the peripheral vessels of the foot (Claude Bernard).

4. Both nerves have themselves relatively large arteries of supply—the *comes nervi ischiadici* and the median branch of the anterior interosseous artery.

5. In the arm the median nerve is intimately associated in its upper reaches with the brachial artery, as are the sciatic and the internal popliteal nerves with the inferior gluteal, perforating, and posterior tibial arteries.

6. The arteries of the hand and foot—the palmar and plantar arches being placed, as they are, at the outposts of the vascular system and nourishing such important structures—receive a relatively very rich nerve-supply compared with the main trunks of the arterial tree.

In causalgia, the nature of the pain—burning (which is unlike that due to irritation of a purely sensory nerve) associated with throbbing, bursting sensations, and exacerbation in the hanging posture or on movement—and the vasodilatation of the skin, with local rise of temperature (Bénisty, Tinel, Stopford), are suggestive of derangement of vasomotor control. Obviously the vasodilator fibres are most affected, for there is no evidence of vasoconstriction, which would be shown by local anæmia and pallor of the skin surface. Moreover, the condition is relieved by assisting vasoconstriction by the application of cold and moisture. Stopford has suggested three possibilities to explain these phenomena of vasodilator instability :—

a. That the nerve injury in some way causes paralysis of vasoconstrictors. There is no reason for this selective action, for the nerve injury in causalgia may be of the slightest, and there is rarely any degree of even partial division of the nerve (*see next section*). Moreover, although vasodilator fibres are more readily stimulated, they degenerate more slowly after section than vasoconstrictors; yet causalgia persists for many months, with no diminution in the vasodilator symptoms, even though there was considerable division of fibres.

b. Direct irritation of vasodilator fibres. There is no reason why there should be special selective action in this direction; moreover, uniform irritation of both vasoconstrictors or vasodilators would result in vasoconstriction, and therefore, as Stopford points out, it would be necessary to suppose either paralysis of the constrictors associated with irritation of the dilators, or specific action upon the dilators, for which conditions there is no supporting evidence. There is this point to consider, however. Bayliss has shown that stimulation which normally gives rise to vasoconstrictor effect, gives only vasodilatation after chloroform has been administered. Now the most important action of chloroform on a peripheral nerve is to produce a decrement in conduction, and therefore it is possible that the injury to the nerve has caused the interposition of a region of decrement which leads to the extinction of certain impulses and to modification of others.

c. Reflex phenomena. There is no doubt that the symptoms of causalgia can be explained along these lines, for if the various changes are considered as reflex phenomena, this state of affairs does not require that any selective action should be exercised; nor does it premise even the actual presence of vasodilator fibres in the nerves affected. The receptor channels for the vasomotor reflexes must be of two kinds:—

i. Those demanding an increase of blood-pressure, and known as pressor. The effect of calls sent along fibres acting as pressor channels would be vasoconstriction.

ii. Those calling for a fall in blood-pressure by relaxation of the normal vasomotor tone, and known as depressor. The effect of calls sent along fibres acting as depressor channels would be vasodilatation. It seems reasonable, argues Stopford, to assume that irritation will provoke a depressor effect as a protective and defensive mechanism. Moreover, the exacerbation of the pain in causalgia and allied states, by emotion, excitement, and attention can be explained by a psychical depressor effect.

Bayliss has shown that dilator fibres to the limbs have a good deal in common with sensory nerves, and are able to convey impulses in both directions, that is centrally, and back to the periphery. Or, in another way, they act both as receptor channels for vasomotor reflexes and effector routes for vasodilatation responses and depressor effects. By this means it may be supposed that irritation of these fibres at the site of injury of the nerve may result in sensory impressions being conveyed to the cord and brain, which project 'antidromic' dilator impulses via the posterior root ganglion to the peripheral area supplied by the nerve-trunk conveying the fibres. This explanation is analogous to Bruce's explanation of the vesicular eruption and pain in herpes zoster.

Again, the pain in causalgia is similar, though multiplied many times in intensity, to the pain caused by a superficial burn of the skin, which, also, is relieved immediately by cold and moisture. Also, on a normal palm or sole, in the areas which are the site of pain in causalgia, a pain-provoking degree of heat causes pain more readily than in other areas.

The pain of the small burn can only be caused by irritation of the nerve-endings in the damaged area, and the pain in causalgia may also be due to irritation of these by the 'antidromic' impulses projected from central origins. In support of this, the pain in causalgia is a superficial pain, as is shown by the fact that the lightest stimulation provokes intense exacerbation, but deeper pressure is well borne. Also the areas of intense pain are not the areas exclusively supplied with deep sensibility by the nerve affected, by which is meant that, if the median and sciatic nerves are completely divided, deep sensibility is usually not lost entirely over the areas which are commonly the site of the intense pain in causalgia, these being partly supplied by overlapping neighbouring nerves.

Harris has described a case where he had reason to believe that in the median nerve there is separation of fibres destined for the dorsum of the fingers and those for the palm, and that this separation takes place early in the nerve-trunk. If this is so, it may be that the fibres which, when irritated, give rise to causalgic conditions, travel in this palmar bundle only. This would explain the occurrence of the pain in the palm in causalgia, for it never occurs on the dorsum of the fingers.

It seems probable, also, that the secretory and trophic disturbances in causalgia can be explained on the same lines as reflex disturbances; especially as vesicular eruptions and blisters, analogous to the eruption in herpes zoster, do occur in causalgia. In further support of the reflex theory is the fact that pain may be also felt in the hand or foot belonging to the uninjured limb. Also, even after amputation of the limb in these cases, pain referred to the peripheral area in the hand or foot may still persist. Simple division of the nerve without resection in causalgia may not cure the pain, which result again can be explained by the persistence of stimuli arising from the damaged central end or from some sclerosed area above the division, or even from below along anastomosing sympathetic fibres to central origins, with reflection of impulses along centrifugal fibres, which may not travel with the trunk of the affected nerve, to the sensory nerve endings of the skin (*Cases 2 and 3*).

Finally, normality of the economy of any living organism depends upon the integrity of its reflexes, and the vast majority of the symptoms of disease are due to disturbances of reflexes. In causalgia

reflexes are disturbed, with as one result that hyperalgesic zones occur in certain peripheral areas. The normal reflex arcs being so disturbed, any added stimulus, mechanical, emotional, or psychical, acts in a reinforcing manner on the stimulus already affecting the arcs from the damaged parts, and this superimposed stimulus is sufficient to produce exacerbation of pain, whereas if applied to a normal undisturbed arc it would produce only the sensation of touch or pressure or some other not unpleasant reaction.

Two other theories have been put forward to explain causalgia :

1. Leriche's theory that the condition is due to a neuritis of the peri-arterial sympathetic system, and is not due to the direct injury to the nerve-trunk. In injuries to the upper arm it is not uncommon for damage to the median nerve to be accompanied by damage to the brachial artery ; but causalgia can arise from a wound of the nerve in the forearm or wrist where there is no injury to any large artery, and in causalgia from injuries to the sciatic nerve there is rarely any serious arterial complication. Moreover, Kramer, Todd, and Potts have demonstrated that the large arteries are supplied at irregular intervals along their course by sympathetic fibres from nerve-trunks, and not by a sympathetic plexus formed proximally, and sheathing the vessels. Again, stripping the artery in the region of injury of all sympathetic fibres (Leriche's operation), or stripping the accompanying vein as well (Tenani's operation), on the ground that ablation of the perivenous sheath will produce dilatation of the vein and diminution of intravenous pressure, which will further the effect of the changes in circulation brought about by the resection of the peri-arterial sympathetic, has no effect in cases of true causalgia. Possibly there are instances of sympathetic peri-arterial neuritis which are benefited by this treatment, but they are not cases of causalgia.

2. It is claimed by some writers (Souttar and Twining, and others) that the fact of both median and sciatic nerves possessing a well-developed vascular supply of their own has something to do with the genesis of causalgia. They believe that the pathological basis of the pain, and the whole gamut of trophic and sensory changes, are due to some alteration in the vascular supply of the nerves, affecting the fibres which supply two of the most sensitive regions of the body. This view is quite untenable, because median causalgia often occurs as a result of injuries to the nerve above the point of entrance of its nourishing artery, even as high as the inner cord of the brachial plexus. Also, causalgia as a result of injury to the posterior tibial nerve is well known, and this can hardly be due to involvement of the vascular supply of the sciatic trunk. Moreover, in more extensive injuries to the median and sciatic nerves, where much interference with the vascular supply to the nerves in the region of the lesions occurs,

there is no development of the causalgia syndrome. Indeed, the actual discoverable injury to the nerves in painful lesions may be very small indeed.

II.—PATHOLOGY AND BACTERIOLOGY.

1. Marinesco and Corner have sought to explain the pain in amputation neuromata by the irritation of sepsis—of an infective inflammation—and Joyce by analogy suggests that inflammatory reaction to certain micro-organisms may account for the development of painful conditions in certain nerve injuries which apparently differ in no way from the many which are not associated with pain. Against this suggestion are the facts that causalgia may occur after clean puncture wounds which heal by first intention without a suspicion of sepsis, and in cases without even a breach in the continuity of the skin surface (*Case 3*). And also, what is perhaps more striking—for the above conditions do not absolutely exclude microscopic bacterial infection of a subacute nature—causalgia and associated painful conditions show no predilection to occur in grossly septic wounds involving nerves.

In *Cases 1, 2, 6, 8, and 9*, cultures were made upon agar slopes and bouillon from the resected portion of nerve, or from the excised fibrous tissue where neurolysis was done. In four of these experiments no growth whatever was obtained after forty-eight hours' incubation at blood heat. In *Case 2* a scanty growth of staphylococci was obtained, and forty-eight hours after the first exploration in this case the wound flared up and a popliteal abscess resulted. Thus in four of the cases at any rate there was no active bacterial infection at the time of operation. In *Case 2* the attempt at relief of the condition by neurolysis was a long and difficult operation, and so the result is vitiated by the possibility of infection occurring during manipulation, for the initial wound was soundly healed long before exploration was attempted, although of course micro-organisms may lie latent in the tissues for a long time. If they have any value, these experiments would seem to show that even the maximum intensity of pain was not associated with active sepsis.

2. From the findings at operations on cases of causalgia and allied conditions, and from the sensory changes noted in these before operation, the constant condition present is one of incomplete anatomical and physiological division of the nerve. From an anatomical standpoint, division is too definite a description, for there is rather an interference only with the anatomical continuity of the nerve, and as a rule there is but little microscopical evidence of actual division of fibres, and the bare nerve conducts electrical stimuli in a way scarcely to be distinguished from the conductivity of a normal

nerve. It is common to find a variable section of the nerve embedded in more or less adherent scar tissue at the site of injury, but often the only finding is a small lateral swelling on the exterior of the nerve, due to fibrosis and repair after a lesion of the sheath. When the extraneural fibrous tissue is dissected away, the nerve may be found swollen and pink, and of a rather denser consistency than normal. There is usually increased vascularity, as evidenced by the considerable oozing of blood during the neurolysis. In some cases the amount of fibrosis is very small, and may have led merely to a diffuse local thickening of the nerve, or the nerve for a short distance may be slightly swollen and indurated or constricted by a fibrous band. In other cases small fibrous nodules can be felt in the course of the nerve at the site of injury. On opening the sheath of the nerve it is possible sometimes to see a few strands of fibrous tissue penetrating between the fasciculi, and also during the stripping of scar tissue small capillaries are cut which are seen to be entering the nerve from the perineural scar area. In wounds involving the sciatic nerve resulting in causalgia, the internal popliteal fibres are always affected. The external popliteal fibres may or may not have received damage. Injury to the external fibres alone probably never results in causalgia.

The conditions found at operation suggest that two types of injury are favourable to the after-development of causalgia.

a. Damage to the sheath of the nerve, more or less extensive, with vascular extravasation into the tissue of the nerve and around it, and subsequent fibrosis during the effort at repair.

b. Bruising of a nerve by the passage of a projectile through adjacent tissues, or by a blow in the region of a nerve, or by any other form of trauma in the neighbourhood of a nerve which will cause rupture of small vessels and outpouring of blood into and about the nerve, with subsequent formation of fibrous tissue.

In the very rare cases in civilian practice not associated with wound trauma, a localized interstitial neuritis, either by reason of the aberrant and unusual selective action of some infection, or gouty deposits in the nerve, may develop into a true causalgia (*Case 3*).

The microscopical lesion in these cases of causalgia and similar painful conditions is one of intraneural fibrosis. In several cases it was possible to obtain the portion of nerve excised at the operation. These were immediately transferred to a 10 per cent solution of formalin in isotonic salt solution, and after fixing were treated in the usual way and embedded in paraffin. Later, thin sections of these tissues were cut, mounted, and afterwards stained by a modification of Cone's stain. From sections stained in this way the microphotographs accompanying this paper were prepared.

On microscopical examination of these sections of excised portions

of nerves, it was found that intraneural sclerosis is the outstanding feature. The fibrous tissue is perifascicular, compressing and distorting the nerve-bundles, and is also found penetrating the ruptured fascicular sheaths and invading the nerve-bundles. Scar tissue can be seen between individual nerve-fibres, distorting and compressing them and causing torsion. In some parts the appearance is of nerve-fibres struggling through masses of fibrous tissue, and in others the young varicose fibrils associated with an attempt at nerve regeneration are seen. Some nerve-fibres appear strangled and degenerate. In some cases many nerve-fibres are affected, in others few, depending partly upon the duration of the case and partly upon the extent of the original injury. Probably very few suffer absolute solution of continuity. The vascularity of the fibrous tissue depends upon its age, and there are no features to distinguish it from ordinary scar tissue found in many cases of damaged nerves which were not associated with the syndrome of causalgia.

The picture is consistent with an early extravasation of blood into the nerve from external capillaries, and also from the intrinsic blood-vessels of the nerve, with subsequent organization and repair processes, formation of granulation tissue in and about the nerve, and the ultimate contraction of this into more or less dense fibrous tissue, which by its irritation and pressure maintains a condition favourable to the production of pain. The same processes in injuries of nerves other than the median and internal popliteal nerves produce irritative symptoms without pain, but associated with paresthesia and altered quality of sensation in the peripheral areas of supply of these nerves.

TREATMENT.

I.—NON-SURGICAL TREATMENT.

The fact that the majority of cases of causalgia and similar conditions arise as a result of war wounds or similar traumatisms, makes early surgical interference a matter for hesitation on account of the risk of sepsis. Consequently, despite the urgency of the symptom of intense pain, arising as it does soon after injury, surgical treatment must be deferred, at any rate until the risk of complicating sepsis can be eliminated as far as possible.

It is in these earlier stages of the severer cases, and in minor cases, that non-surgical procedures are adopted, for, in a condition which, unrelieved, is so devastating in effect, something must necessarily be done to protect the patient either until, in minor cases, the severer symptoms subside, or, in major cases, surgical interference can safely be undertaken.

Non-surgical treatment is of little use in true major causalgia

except as a palliative. In general, dry and wet heat, massage, rhythmic faradic baths, galvanic or faradic stimulation, radiant heat, diathermy, or the paraffin bath, aggravate the condition and increase the pain. Morphia will, of course, ease the pain. Local applications of slowly volatilizing substances, cold wet compresses, the anodal galvanic baths, and ionization are of use in minor conditions, but give very temporary relief in major causalgia. X-ray treatment, radium therapy, and fibrolysin have all been tried many times, without much success.

II.—SURGICAL TREATMENT.

Whilst a case is waiting for operation, a certain amount of relief can be obtained for the patient by wrapping the painful member in lint, which is kept continually moist with some evaporating solution or with water, and supporting the limb firmly upon pillows, in a position which is comfortable relative to the rest of the body. When pain and other symptoms show no sign of diminution in about two months, surgical interference is warranted, or earlier if the pain is so severe that it is reacting unfavourably on the patient. In minor cases which show signs of increasing compression and irritation of the nerve, evidenced by increasing loss of function and deeper sensory loss, and perhaps more severe pain, operation is at once to be undertaken.

Excision and Suture.—The surest and safest and only treatment for the relief of major causalgia is excision of the affected portion of the nerve, followed by end-to-end suture where possible, as it nearly always is, or by nerve-graft where a large section has to be removed and apposition of the divided ends is impossible. In view of the local naked-eye appearance of the nerve, which is often very good, this treatment may seem drastic, for the anatomical continuity of a nerve is deserving of great respect: but because of the slight tendency to spontaneous recovery and the negligible effect of all other treatment, and the fate of untreated cases, it is justifiable. Immediate relief from pain results, and temporary paralysis, with, in most cases, the practical certainty of progressive painless return of function, is much to be preferred to long months of intense pain and the gradual evolution of a useless contracted hand or foot.

In true major causalgia the precision of the knife is a welcome and desirable attribute, although its employment may appear harsh: but

“ Diseases, desperate grown,
By desperate appliance are relieved,
Or not at all.”

Sicard and Imbert have tried to cure causalgia by dividing the nerve well above the lesion without interfering with the site of injury,

but without success. Souttar and Twining claim to have cured an obstinate case, which did not yield to high division of the sciatic nerve, by section of the anterolateral tract of the spinal cord in the dorsal region.

Neurolysis.—In minor and less painful cases, where probably the intraneural fibrosis is very small and the condition due to the effect of perineural scar, a partial operation may sometimes be undertaken. Careful separation of all adhesions is necessary, and the careful dissection and removal of all the perineural fibrosis. Control of hæmorrhage is very important to prevent recurrent adhesions and the re-formation of fibrous tissue. When a nerve is stripped bare and freed from all scar tissue, it should be placed in a protective bed of fat or muscle. Extraneous materials, such as Cargile's membrane, or a sheath of vein, or rubber, are liable to cause the formation of a fibrous sheath around the nerve—a result not to be desired. The muscle bed in contact with the stripped nerve should be of uninjured muscle, and should be sutured round the affected portion of nerve.

Careful neurolysis on these lines, followed by suitable physiotherapeutic treatment, such as massage, electrical stimulation of muscles, exercises, etc., will sometimes suffice for recovery in less severe cases: but it is necessary to remember that a good end-to-end suture is better than a bad neurolysis. Neurolysis in true major causalgia is useless, and it is waste of time to attempt it.

It is quite impracticable to dissect away the intraneural scar tissue as Stoeffel advises and claims to do. The microscopical appearance of the nerve demonstrates that it is impossible under any ordinary operative conditions to dissect even the perifascicular fibrous tissue, much less the intrafascicular scar tissue, without doing more harm than good.

Alcoholization of Nerve-trunks. Various surgeons have injected alcohol or cocaine into the affected nerve as a form of treatment, and French writers claim a great deal for Sicard's method of injecting a few cubic centimetres of 60 per cent absolute alcohol into the nerve a little way above the lesion, and into all local branches, after surgical exposure. According to Sicard, this produces a physiological interruption of the nerve, with relief from pain.

There is no doubt that this procedure will relieve pain, but it is a poor substitute for surgical operation, which is aimed at the pathological basis of the condition. Moreover, frequently in causalgia, after alcohol injection, the nerve recovers in a few weeks and the pain returns with renewed intensity. Alcohol injection also is an uncontrollable method of treatment: it lacks the delicate accuracy of the surgeon's knife. It frequently fails, and may cause more fibrosis and so increase the pathological condition it is intended to cure: it

may cause absolute interruption of the nerve, with paralysis and R.D. in the muscular supply, which may never recover spontaneously. In short, it is not possible to estimate the extent of the additional fibrosis and destruction that may occur as a result of alcoholization, or the increased disability that may so be caused. Severe trophic ulceration may also result. It is a clumsy and hardly scientific method, and certainly not to be substituted for surgical procedures. Yet certain observers assert that they have used it with effect, and Lewis and Gatewood claim that in one of three cases of theirs of median causalgia there was no return of pain in four months. They say nothing about return of function, however. Giron uses it in true Weir Mitchell causalgia, and Sicard himself claims to cure 60 per cent of cases by his method.

The injection of cocaine, except for the temporary relief of pain in the worst cases, is not advisable.

Peri-arterial Sympathectomy.—Leriche's and Tenani's operations, or denudation of the associated arteries and veins of their sympathetic fibres as already described, are of no value in true causalgia, although they may be in certain cases of peri-arterial sympathetic neuritis. Tinel, Veyrassat, and Schlesinger report favourably upon its use; but Giron says that the causalgia of Weir Mitchell is not curable by this method, although another type, exclusively sympathetic, yields to denudation of the peri-arterial sympathetic. These operations have been performed on one or two cases of causalgia within the knowledge of the writer, but without success from a curative point of view.

POST-OPERATIVE TREATMENT.

After neurolysis of the nerve in minor cases, and diminution of the pain, ionization of the scar area with 1 per cent sodium chloride solution is a valuable adjunct to the daily treatment of the case. Where the pain is diminishing, it seems to hasten relief and, combined with massage and electrical stimulation of the weak group of muscles, materially aids recovery. Since the muscles always respond to faradism, surging faradism is usually to be employed; but if as a result of neurolysis one or two muscles fail to respond to faradism, as they sometimes do as a result of operative trauma of some nerve fibres, interrupted galvanism is used until faradic excitability returns.

Passive movements are employed for stiffened joints, and use of the limb is encouraged. Useful employment of the hand in some form of curative workshop treatment assists in re-education of muscles and helps co-ordination.

Minor cases rapidly recover good function.

After resection and suture of a nerve, the muscular supply of the nerve will be paralyzed, and complete sensory loss occurs in

the peripheral area of distribution. These cases demand the after-treatment of any nerve lesion after suture. As the nerve begins to regenerate, trophic changes commence to clear up rapidly. Massage, constant current (in the very early stages), and interrupted galvanic stimulation (18 to 25 contractions of each muscle at every treatment) to the paralyzed muscles maintain their tone until they are beginning to be innervated again. When a muscle recovers its excitability to faradism, surging faradism may be used. When the sensory loss has cleared sufficiently to permit of it, the paraffin bath is a great help in improving the circulation and helping the limb to become supple. Stiff joints are helped by passive movements and by diathermy or radiant heat, care being taken to avoid burns of anæsthetic skin. As soon as voluntary power returns, that is, in from nine to eighteen months as a rule, use is encouraged, and, later, re-education movements and the curative workshop treatment are called in to help in the final restoration of function. Obstinate contracture, if this has occurred and cannot be overcome by routine physiotherapeutic treatment, may call for tenotomy or tendon lengthening, combined perhaps with suitable intermittent splinting.

The patient should remain under supervision until every muscle has recovered its motor power.

PROGNOSIS.

The prognosis is excellent in all cases of causalgia, major and minor, due to wounds of nerves, if suitable treatment is undertaken early. Minor cases may clear up in a few months without active intervention at the site of injury, under proper physiotherapeutic treatment.

In major cases, with careful resection followed by end-to-end suture of the nerve under good conditions, the prognosis is that of any good nerve suture in non-painful cases. That is, the end-result is complete recovery of function without recurrence of pain in 90 per cent of cases, in a variable length of time, given suitable post-operative treatment.

In cases where repair of the nerve has to be undertaken by nerve-grafting, although pain is abolished, the prognosis as regards recovery of muscular function is poor. Recovery is very slow and uncertain, and is often arrested before it has gone far. There is usually considerable recovery of sensation in time, and trophic changes clear up slowly.

In cases of long duration, where contracture, bony atrophy, and ischæmic states have developed before operation is undertaken, the end-results may be vitiated by a residuum of permanent contracture, or stiff joints due to articular changes. There may also be so much

fibrous change in some muscles that complete return of muscular function never takes place. But at any rate the pain will be abolished, and the less grave trophic conditions will be much improved.

In cases of the nature of *Case 3*, where there is absence of physical trauma, the prognosis is less favourable, but at the same time much can be done to alleviate the condition. Fortunately these cases are very rare in civilian practice.

NOTES ON THE SENSORY CHANGES IN CAUSALGIA AND ALLIED STATES.

In all cases of causalgia and like conditions there is found some sensory change in the peripheral area of supply of the nerve, because there is interference with the conducting path. There seems to be doubt as to the existence of three different sets of fibres, as theorized by Head and others, for the conduction of three types of sensation—deep, protopathic, epicritic. Cutting the sensory nerves to the skin does not abolish deep sensibility in their area of supply. May this not be because they have no connection with the deeper structures?—e.g., deep sensation in the radial area is supplied chiefly by the median and musculocutaneous nerves. Were it possible to transplant the radial-nerve filaments to the deeper end-organs, there seems no reason why they should not conduct deep sensibility. Again, may not the altered quality of response to stimulus in the peripheral nerve area be due to changed interpretation due to alteration in the power of conduction of the nerve?—perhaps, in the case of tingling and pins-and-needles paræsthesia, to a phenomenon of rapid intermittence of conduction through regions of decrement in the damaged portion of the nerve? The slightest injury to a nerve causes fleeting modifications of its 'chronaxie' (or velocity of excitability) and to its power of conduction. The fact that the alteration in quality of response to stimulus is not uniform over the area supplied by the damaged nerve can be explained by unequal trauma—some fibres are injured more than others.

Recovery of epicritic sensibility (so-called) may be incomplete five years after suture of a nerve. Neither has the conductivity of the nerve returned to normal, and even the muscles innervated by the nerve show deficient reaction to condenser currents.

In most cases of causalgia, and in many non-painful partial lesions of nerves, there is no loss of deep sensibility, though there may be complete loss of epicritic and protopathic sensibility. It is hard to imagine why a lesion should be able to select and spare one set of fibres in three.

As a sutured nerve recovers, deep sensibility returns first, then

protopathic, and lastly epieritic, which is what one would expect. As the regenerating nerve recovers its normal conductivity and velocity (or delicacy) of excitability, the finest and most delicate differences of stimuli are appreciated last. Deep sensibility, being a comparatively coarse function, returns first, even when the conductivity of the nerve is much below normal. Absence of so-called epieritic sensation on the glans penis is a useful provision of nature, but there is no reason why it should not be due to lack of sensitivity of the transmitting mechanism rather than to absence of 'epieritic' fibres. Besides, the sensations which are aroused by light stimulation in other parts can be aroused by rather heavier stimulus of the glans; that is, the relatively coarser transmitter requires stronger stimulus to excite it.

Adrian has used short-duration currents to examine the question whether there is more than one excitable mechanism in the afferent nerves of man. The curves obtained showed no indication of two different excitable systems in human afferent nerves. This, while being suggestive, does not disprove Head and Rivers' assumption of protopathic and epieritic fibres.

Without a good deal more evidence it is impossible to jettison the idea of separate fibres for the transmission of different types of sensation, but there seems to be something to be said to the contrary.

The sensory changes in causalgia and allied states are what one would expect when it is considered that the lesion is partial anatomical and physiological division of the nerve. They vary in depth according to the degree of local damage to the nerve; as this is usually relatively slight, deep sensibility is as a rule undisturbed.

1. **Light Touch.**—There is invariably disturbance in this direction. Sensibility to light touch may be absent in certain areas, or there may be simply hypo-aesthesia. As a rule, light touch stimulus in the peripheral area of the nerve affected in causalgia gives rise to that altered quality of response known as paraesthesia. The response seems more vivid, but the threshold is higher than normal.

2. **Sensation to Pin-prick**—Is always altered in these cases over a large area. This is to be expected, sensation to pin-prick being a compound one composed of a sense of 'pressure' and a sensation of 'sharpness', the latter of which belongs to the epieritic class of discriminating sensibility. The change of response to pin-prick extends always over a much greater area than the absolute loss to light touch. After the complete surgical division of a nerve it was found that the margin at which pin-prick is felt normally is just outside the margin of total loss to light touch, and not vice versa as Stopford and Core state. Pin-prick is felt as a blunt sensation, it is true, inside the margin of total loss to light touch, but along this line the response is not normal.

3. **Thermal Sensibility.**—Reliable readings could not be obtained, but there was undoubtedly some disturbance.

4. **Deep Sensibility.**—

a. Pressure.—Undisturbed as a rule, though responses masked and changed by superficial sensory disturbances.

b. Roughness.—The radiating tingling and other sensory abnormalities made readings unreliable, though there seemed to be some diminution in this sense.

c. Localization.—Disturbed by the misleading references caused by the paræsthesia and abnormality of response to touch. Deep localization probably not impaired.

d. Joint and Muscle Sense. Bone Sense. Unimpaired as a rule. Bone sense to tuning-fork vibration scarcely ever showed any change from the normal.

5. **Discriminating Sensibility.**—

a. Size and Shape.—Disturbed by reason of the pain and paræsthesia causing aberrant impressions. There was never absolute astereognosis.

b. Texture.—Recognition depending upon retention of finer sensibility, this sense was also disturbed.

6. **Weber's Test.**—There was generally some disturbance in the accurate recognition of two blunted points applied simultaneously, provided pressure sense was not evoked.

The examination of deep sensibility in conditions where superficial response to stimulus is perverted is a matter of great difficulty, because of the superficial reference sensations set up in applying the test, before deep sensibility is stimulated. Generally speaking, in causalgia and like conditions there is marked disturbance of the more superficial sensibility, and deep sensibility shows no change except in its finer degrees, such as in the 'blunt' sensation part of the compound sensation of pin-prick.

CONCLUSIONS.

The fundamental lesion in causalgia and allied conditions is one of intraneural and perineural sclerosis, and the irritation thus set up of fibres at the site of injury to the nerve causes perverted afferent impulses to be sent back to the cord, and possibly further to the subcortical and cortical centres, and thence efferent responses of vasodilator, secretory, and trophic natures are reflected to the peripheral distribution of the nerve, where reaction on the end-organs and sensory corpuscles in this area is interpreted as pain.

The reason why lesions of this type of the median nerve and internal popliteal fibres produce a true causalgia in some cases, pain of less severity in others, and in the remainder nothing but the

discomfort of partial sensory loss, is difficult to answer. It is improbable that inflammatory reaction to different groups of organisms provides a solution. It hardly seems possible that irritation of a special group of fibres is the cause, for causalgia is rare, and it is not within the range of probability that such fibres should be so seldom involved. The most that can be said is that there is some peculiarity in the trauma of the nerve in these few cases, which causes disturbance of those cells in the brain whose function it is to interpret as pain.

By resection of the irritated and sclerosed portion of nerve, the source of the perverted impulses is removed and the pain vanishes: and by restoring the continuity of the nerve, the path for normal impulses is re-made and gradually recovers its conductivity as the nerve regenerates.

I have to thank surgical colleagues at the 2nd Northern General Hospital for their courtesy in allowing access to operations, and operation notes, and Dr. J. le F. Burrow for drawing my attention to the method of using colours in charting sensory changes. The diagrams used for charting were kindly supplied by the Medical Research Committee.

TABULAR LIST

Table I.—MAJOR

SIGNS AND SYMPTOMS AT EXAMINATION.

Case Number, Name, Date, Nature of Wound, etc.	Duration of Condition.	History and Treatment before coming under observation.	Pain.		Motor Changes.			Sensory Changes.
			Time of Onset after Injury.	Description.	Voluntary Power.	Faradic Responses.	Galvanic Response.	
<i>Case 1.</i> W. H., age 36, G.S.W., left upper arm, 9/10/17.	15 months.	Jan., 1918: Neuro- lysis and stretching median nerve. Ap. '18: Intra-neural injection 60 per cent alcohol below site of injury. Massage, electrical, whirlpool and paraffin baths. No relief.	10 days	Intense burning smarting pain in usual area, worse on warm days.	Power in all median muscles; little atrophy; slight con- tracture; marked tremor both hands.	All muscles react, diminished responses.	K.C.C. > A.C.C., brisk above site of alcohol injection. Thenar muscles, A.C.C. > K.C.C., sluggish No R.D.	No deep loss. Some loss to light touch. Much parasthesia in typical area. Localization poor. Weber's test: typical disturbance.
<i>Case 2.</i> A. D., age 26, G.S.W., Right knee, 22 8/17.	16 months.	Drop-foot developed immediately. External popliteal nerve said to have been sutured. Oct. '17: Massage, in- terrupted galvanism; no relief. No treatment for internal popliteal nerve.	14 days.	Intense continuous burning pain in sole. Some aching of dorsum. Worse warm dry days.	All muscles supplied by both nerves have degree of power.	As Case 1. Responses sluggish.	Long muscles K.C.C. > A.C.C., sharp. Small muscles A.C.C. > K.C.C., sluggish. No R.D.	As above ap- plied to internal popliteal area. Some disturbance external popliteal area.
<i>Case 3.</i> Mrs. W., age 60, No injury.	7 years.	Arose in 1912 after attack of cholelithiasis. Pain left median area. Local application, anodal galvanism. Drug treatment. Nov., 1917: Intra-neural alcohol up- per arm. Mar., 1918: Alcohol injection re- peated. Oct., 1918: Left median nerve divided and re-sutured.		Intoler- able constant burning pain in median area and in index and thumb. Worse dry warm days.	All muscles had power before nerve division.	All muscles reacted to faradism.	All muscles K.C.C. > A.C.C., Fairly brisk responses.	No deep loss when first seen. Nerve recovering after suture. Some loss light touch and much parasthesia. Localization poor. Weber's test: typical distur- bance.
<i>Case 4.</i> E. V. H., age 24, G.S.W., left elbow, 15/9/16.	3 months.	Local applications, anodal galvanic baths. Not thought at this time there was any serious nerve lesion.	9 days.	Intolerable constant burning pain, usual area. Warmth makes it worse.	Degree of power every- where. Flexor long, pollicis and thenar group very feeble. Com- mencing con- tracture.	All but flexor long, pollicis and thenar group react.	Perverted responses, No. R.D.	Parasthesia over whole median area. Locali- zation poor. Weber's test: typical distur- bance.
<i>Case 5.</i> Pte. A., age 21, G.S.W., left shoulder, 2/11/14.	6 weeks	Treatment of wound only.	14 days.	Severe burning neuralgic pain in usual median area. Warmth makes it worse.	Paresis. Atrophy thenar group. Slight con- tracture.	Median muscles all react.	A.C.C. > K.C.C., No. R.D.	Sensory changes in area of inner cord of brachial plexus. No deep loss. Parasthesia median area.

OF CASES.

CAUSALGIA.

TREATMENT.

Vasomotor and Trophic Changes.	Mental and Emotional State.	Non-surgical.	Surgical.	Operative Findings.	Post-operative Treatment.	Progress.
Conical fingers, curved ridged nails, skin thin, pink, and glossy. Hyperidrosis. Stiff joints.	Nervous, jumpy, worried. Dreads sudden stimulus. Protective attitude. Carried wet rag.	Nil.	Jan. 16, 1919: Resection of hard scarred portion of nerve, followed by end-to-end suture.	1 in. median nerve found hard and scarred in lower third upper arm. Much perineural scarring.	Massage, interrupted galvanism, and later faradism, warm-water baths. Finally exercises and re-education.	Jan. 29, 1919: No pain, full median motor and sensory paralysis. Jan. 1921: Nerve recovering, no pain, all muscles a degree of power and faradic response. Trophic changes much improved. Residual sensory loss. Joints rather stiff.
Skin of sole dead-looking, smooth and sodden. Nails dull and brittle. Whole foot has lost character, and is smaller than normal. Toes fallen together. Hyperidrosis. Branny desquamation on lorum.	Patient nervous, scared-looking, and apprehensive. Protective attitude. Intolerant of investigation, and emotional to tears. Carried wet rag.	Nil.	Dec. 12, 1918: Neurolysis both internal and external popliteal nerves. Sepsis followed. No relief. Jan., 1919: internal popliteal nerve divided and left so. Patient did not allow further operation.	Intense perineural scarring both nerves, and much intraneural scarring internal popliteal nerve.	Massage, anodal galvanic baths, and radiant heat.	May, 1919: All external popliteal muscles acting. Full motor and sensory loss internal popliteal supply. No burning pain. Some aching of dorsum. May, 1920: No pain. Paralysis of internal popliteal muscles. Patient working and getting on well. 1921: Still free from pain.
Conical fingers, curved nails, skin thin and pink. Crops of pin-head vesicles arising spontaneously. Sweating of palm.	Fairly good.	Anodal galvanic baths.	Dec., 1918: Left median nerve again divided higher up and again sutured. No resection.	Not seen. Condition said to be due to gouty deposits in the nerve.	Anodal galvanic baths, gentle massage and movements of fingers.	1919: Pain by no means so severe, and easily comforted. Burning character lost. Aching still. Median nerve regenerating. Some forearm muscles have power. Thenar group atrophied and paralyzed.
Typical trophic and vasomotor changes.	Bad. Pronounced mentally deficient before cause recognized. Very emotional and apprehensive. Protective attitude. Carried wet rag.	Dia-thermy: no relief. Anodal baths: no lasting benefit.	Dec., 1916: Neurolysis left median nerve. No relief. Mar. 4, 1918: Resection and suture.	2 1/2 in. left median nerve found involved in scar tissue and containing fibrous nodules.	Massage, passive movements. Interrupted galvanism, anodal baths.	1918, late: Invalided from service. No pain now. Mental state normal. Paralysis of flexor long. pollicis and thenar group. Recovering median nerve. Not seen again.
Skin bluish-pink and sodden, glossy on dorsum, fingers conical. Nails ridged and brittle. Hand approaches bird-law type. Joints rather stiff.	Fairly good. Carried wet rag in palm.	Nil.	Dec. 18, 1914: Inner cord brachial plexus dissected and then sutured.	2 in. inner cord found embedded in young fibrous tissue. Some intraneural scarring. Brachial artery collapsed and pulseless.	Massage, interrupted galvanism, later faradism. Exercises.	May 25, 1915: No pain except of minor character. Jan. 12, 1919: Patient working. All muscles a degree of power. Almost perfect functioning hand. Sensory return not quite perfect.

Table II. MINOR CAUSALGIA AND

Case Number, Name, Date, Nature of Wound, etc.	Duration of Condition.	History and Treatment before coming under observation.	Pain.		Motor Changes.			Sensory Changes.
			Time of onset after injury.	Description.	Voluntary Power.	Paradic Responses.	Galvanic Response.	
Case 6. G. W. G.S.W. right upper arm 31 3 18	3 months	Treatment of wound only.	10 days	Severe neuralgic pain. Variable. Worse cold days.	All median muscles have power.	All give responses.	K.C.C. > A.C.C., rather slow.	Paresthesia to all forms of stim- ulation over me- dian area. No total loss to light touch.
Case 7. W. O. H. G.S.W. right but- tock, 13 11 16	12 months.	Neurolysis right sci- atic nerve. Mar. 10, 1917: No relief. Neu- rolysis repeated June 24, 1917: No relief.	7 days	As above, in sole area. Calf muscles painful.	External popliteal muscles paralyzed. Internal popliteal all power. Some atrophy.	Nil in ex- ternal popliteal group. Others react.	Not tested owing to pain.	Much paraes- thesia in internal popliteal area. Total loss external popliteal area.
Case 8. J. W. H. G.S.W. right wrist, 27 11 17	21 months.	Aug. 1918: Neuro- lysis rt. median nerve. Some relief. March, 1919: Neurolysis re- peated. Massage, ioni- zation, modal baths.	7 months.	Sensitive scar at wrist. Pain in palm and spasm of fingers. Aching of wrist.	Paresis of thenar muscles.	Nil.	A.C.C. > K.C.C., sluggish. No R.D.	A little total loss to light touch. Elsewhere intense parasthesia.
Case 9. A. H. G.S.W. right thigh, 21 6 17.	10 months.	Treatment of wound only.	14 days	Severe neuralgic pain on sole. No burning quality.	All muscles very feeble.	Most muscles reacted feebly.	K.C.C. > A.C.C., sluggish. No R.D.	Some loss light touch and paraes- thesia. internal popliteal area. Slight paraes- thesia. external popliteal area.
Case 10. E. M. G.S.W. right knee, 20 9 17.	3 months.	Treatment of wound only.	7 days.	Intense aching pain in usual spot on sole.	All sciatic muscles group feeble power.	Nil. Small currents only tried owing to intol- erance.	Nil.	No total loss to light touch Hypo- and par- aesthesia.
Case 11. T. J. G.S.W. left upper arm, 4 11 18.	3 months.	Treatment of wound only.	14 days.	Gripping, burning pain, median area, eased by warmth.	All acting. Thenar group feeble and atrophied.	All reacted except thenar group.	A.C.C. > K.C.C., fairly brisk.	Loss light touch index finger. Par- aesthesia usua area. Elsewhere hypo-aesthesia Localization poor Discriminating sensitivity no good.
Case 12. G. E. F. G.S.W. right upper arm, 18 8 16.	23 months.	Massage, interrupted galvanism, static breeze, ionization, high- frequency current, x-ray treatment, diathermy. No real benefit, but pain got more bearable as time went on.	4 days.	Constant severe burning pain in usual area.	All had power.	All muscles reacted.	—	Parasthesia ove whole media area. No loss t light touch. Loca lization poor. Di criminating sens ibility diminished

ALLIED PAINFUL CONDITIONS.

TREATMENT.						
Vasomotor and Trophic Changes.	Mental and Emotional State.	Non-Surgical.	Surgical.	Operative Findings.	Post-operative Treatment.	Progress.
Skin pink and swollen in palm, fingers conical, nails dull and shed. Little or no contracture.	Apprehensive. Protective attitude. Hyper-sensitive to sudden stimuli.	Nil.	July 5, 1918: Neurolysis right median nerve. Section not deemed advisable.	Much perineural scar tissue, but the stripped nerve smooth and soft.	Massage, anodal baths, interrupted galvanism, faradism, re-education exercises.	Sept. 4, 1918: Pain almost gone. All muscles acting. Little contracture. Nov. 12, 1918: No pain. Contracture worse feature.
Skin pink-purple. No sweating. Nails dull and brittle. Delayed shedding of epiderm.	Apprehensive. Protective attitude. Intolerant of examination.	Nil.	Nov. 23, 1917: Resection and suture external popliteal nerve. Intraneural alcohol internal popliteal nerve, after neurolysis.	External popliteal nerve divided. Internal popliteal nerve bound up in scar, but soft when stripped.	Anodal galvanic baths. Ionization of scar area.	Pain returned in a week. May 30, 1918: Pain better. Sensory loss deeper. Paralysis all muscles. Mar. 25, 1920: Pain gone. Paralysis unchanged. Nerve not regenerating after alcohol. Trophic sore on little toe.
Very little. Skin damper and warmer than normal.	Very jumpy and emotional, and intolerant of examination	Nil.	Mar. 13, 1920: Resection right median nerve, followed by suture.	Nerve badly swollen and scarred. Perineural and intraneural scarring.	Massage and movements. Interrupted galvanism small muscles.	April 23, 1920: Much better. No pain. Mental state better. Some tingling on percussion of scar. Aug. 25, 1920: Nerve regenerating. No pain.
Foot swollen, red, and cold. Nails dry and broken. No sweating. Slight contracture.	Good.	Massage, ionization, galvanism. No relief. Sensory changes more profound.	Aug., 1918: Resection right sciatic nerve followed by suture.	1½ in. of nerve badly scarred and involved in surrounding fibrous tissue, which was hard.	Massage, interrupted galvanism, warm-water baths.	Mar., 1919: No pain. Foot still blue and edematous. June, 1919: Nerve regenerating. Power gastrocnemius. Dec., 1919: No return of pain.
Foot swollen. Glossy skin on toes. Nails curved, red, and ridged. Sweating.	Intolerant of handling; otherwise good.	Nil.	Jan. 5, 1918: Neurolysis both branches of sciatic nerve. No relief. June 30, 1918: Resection both nerves and suture.	Both nerves involved in much scar at bifurcation of sciatic. Bulk of each nerve healthy-looking.	Massage, interrupted galvanism, etc.	Sept. 5, 1918: Pain gone. Oct. 3, 1918: No return of pain. Nerves regenerating.
Skin of palm thick, damp, and leathery looking. Delayed shedding of epiderm.	Apprehensive. Protective attitude. Does not stir out of hospital grounds.	Anodal galvanic baths, with some relief.	Nil.			Some relief from non-surgical treatment. Patient very shortly transferred and lost sight of.
Very marked. Hand stiff and swollen. Joints very bad—obvious joint changes. Nails dull and shed. Skin thin and glossy. Swelling of palm.	Apprehensive, nervous. Sensitive to least jarring or other stimulus. Better than has been when pain at its height.	Paraffin baths, massage and movements. Anodal baths, and later faradism.	Passive movement of joints under anæsthetic. Result poor.	Too late for surgical help. Should have been undertaken earlier.		Dec., 1919: Pain almost gone, but hand unfit for useful purposes owing to permanently damaged joints. Early resection and suture with suitable after-treatment would probably have given a useful hand.

Table II.—MINOR CAUSALGIA AND

Case, Number, Name, Date, Nature of Wound, etc.	Duration of Condition.	History and Treatment before coming under observation.	SIGNS AND SYMPTOMS AT EXAMINATION.					
			Pain.		Motor Changes.			Sensory Changes.
			Time of Onset after Injury.	Description.	Voluntary Power.	Faradic Responses.	Galvanic Response.	
Case 13. M. A. G.S.W., right forearm. 16/9/16.	12 months.	Not known.	11 days.	Constant aching pain, usual area.	Median muscles all acting.	Diminished reactions.	A.C.C. > K.C.C., sluggish.	Paræsthesia whole median ulnar areas. No total loss light touch. Localization and discriminating sensibility poor.
Case 14. P. S. G.S.W., left forearm. 6/1/17.	14 months.	Not known.	10 days.	Severe aching pain in palm.	Paresis median muscles.	Reduced reactions.	—	Paræsthesia median area. Poor localization and discriminating sensibility.
Case 15. J. W. G.S.W., left upper arm. 6/1/17.	15 months.	Treatment for wound only.	1 year.	Constant boring pain in palm.	Paresis median muscles. Slight contracture.	All responded to faradism.	—	Hypo-æsthesia whole median area. Paræsthesia to strong stimulation.
Case 16. R. D. J. Shell wound left upper arm. 22/3/18.	10 weeks.	Treatment for wound only.	11 days.	Constant burning pain, usual area.	Paresis median muscles.	Poor responses.	K.C.C. > A.C.C., fairly brisk.	Hypo-æsthesia as above, a paræsthesia stronger stimulation in type area.
Case 17. W. L. G.S.W., right forearm. 28/8/17.	9 months.	Treatment for wound only.	1 month.	Severe aching pain in palm.	Paresis median muscles. Slight contracture.	Poor responses.	—	Paræsthesia over median area. Localization poor.
Case 18. J. H. S. G.S.W., left upper arm. 26/9/17.	3 months.	Treatment for wound only.	7 days.	Dull aching pain usual area.	No paralysis of muscles.	All gave responses.	—	Paræsthesia of whole median area. Localization good. astereognosis.
Case 19. F. W. S. G.S.W., left forearm. 28/12/17.	2½ months.	Treatment for wound only.	2 months.	Throbbing bursting pain. Worse in cold weather.	Thenar group feeble and atrophied.	Thenar group no responses.	K.C.C. > A.C.C., brisk.	Some loss light touch, which is increasing. Paræsthesia to strong stimulus. Hypo-æsthesia radial area. Localization poor.
Case 20. A. W. A. G.S.W., right upper arm. 26/11/17.	4 months.	Treatment for wound only.	21 days.	Intense aching pain in palm, getting worse.	Paresis only, median group.	All gave responses.	A.C.C. > K.C.C., brisk.	Paræsthesia of median area. Some hypo-æsthesia. Loss light touch. Intercutaneous area.
Case 21. Pte. W. G.S.W., left upper arm. 22/5/18.	12 months.	Treatment for wound only, and a little massage.	14 days.	Constant aching pain in palm.	Paresis only median muscles.	All gave responses.	—	Paræsthesia whole median area. Defective localization discriminating sensibility.

ALLIED PAINFUL CONDITIONS—continued.

Vasomotor and Trophic Changes.	Mental and Emotional State.	TREATMENT.				
		Non-Surgical.	Surgical.	Operative Findings.	Post-operative Treatment.	Prognosis.
Tapering fingers, nails curved and overgrown, skin pink, thin, and glossy. Branny desquamation of palm.	General health suffering from pain.	Nil.	Sept. 8, 1917: Resection followed by suture, median nerve; neurolysis ulnar.	Large bulb involving whole circumference of median. Nerve fibres not distinguishable in mass. Ulnar bound in scar.	Massage, interrupted galvanism, surging faradism.	Nov. 19, 1917: No pain. Full median motor and sensory loss. June 4, 1918: No pain. Median nerve regenerating. Ulnar nerve recovered.
Tapering index and thumb, itching of nails, sweating of palm, skin very pink.	Fairly good.	Nil.	Nov. 5, 1917: Neurolysis left median nerve.	Much perineural scarring. Small lateral bulb on nerve.	Diathermy scar area, massage, anodal baths.	Jan. 1, 1918: Pain reduced. Feb. 8, 1918: Pain almost gone. Hand comfortable except for some tingling of palm.
Tapering median fingers, arched edged nails, glossy skin.	Good.	Nil.	June 1, 1918: Neurolysis left median nerve, which was placed in new muscle bed.	2 1/2 in. of nerve seemed very poor but resection not done. Musculo-cutaneous nerve found damaged.	Massage, anodal baths, galvanism, etc.	Sept. 17, 1918: Pain insignificant. All muscles acting well. Hand becoming useful.
Skin of palm pink and sweating. Minute trophic vesicles in median area.	Good.	Anodal baths, ionization of scar area, massage, etc.	Nil.			Nov. 13, 1918: Pain practically gone. Trophic blisters cleared up. Inability to flex index properly.
Conical fingers, in of palm no ooth and ash-pink. Nails little. Hyperostosis.	Good, but reluctant to be examined.	Nil.	May 27, 1918: Resection right median nerve, followed by suture.	About 2 in. of nerve embedded in scar tissue. Some hardness of nerve when stripped.	Massage, galvanism, etc.	Aug. 2, 1918: No pain. Dec. 21, 1918: No pain. Power in forearm flexors. May 13, 1919: No return of pain, nerve regenerating.
No trophic changes of note.	Good.	Ionization scar area and anodal baths; massage	Nil.		—	Pain gone in a few months. No operation necessary.
No marked trophic changes, no delayed reddening of epiderm.	Good.	Nil.	June 10, 1918: Resection left median nerve, followed by suture.	Small lateral bulb found on median nerve. Perineural scarring.	Massage, galvanism, etc.	July 3, 1918: No pain. Nov. 18: No pain. Nerve regenerating. Feb. 8, 1919: No return of pain. Progressive regeneration.
Tapering fingers, glossy skin, no hyperidrosis, skin mottled pink.	Good.	Anodal galvanic baths and massage. No relief.	June 13, 1918: Neurolysis right median nerve.	A little perineural scar tissue. No naked-eye lesion of cleaned nerve.	Anodal baths, ionization scar area, massage.	Pain cured by Feb. 10, 1919. Muscles more power. Some residual hypoaesthesia.
Skin sodden-looking and sweating. No contracture.	Good.	Anodal baths, ionization, diathermy, exercises, work-shops.	Nil.	—	—	Much improvement in 2 months. Condition rapidly cleared up.

Table II.—MINOR CAUSALGIA AND

Case, Number, Name, Date, Nature of Wound, etc	Duration of Condition	History and Treatment before coming under observation	SIGNS AND SYMPTOMS AT EXAMINATION.				
			Pain.		Motor Changes.		
			Time of Onset after Injury	Description.	Voluntary Power.	Faradic Responses.	Sensory Changes.
Case 22. J. W. S. G.S.W. right elbow. 15 7/17.	7 months.	Treatment for wound only, and a little massage.	—	Unpleasant sensations in palm. No real pain now.	Paresis median muscles. Flexor contracture Atrophy.	All gave responses.	Paræsthesia median and ulnar areas, chiefly former. Some total loss light touch ulnar area.
Case 23. H. R. C. G.S.W. right elbow. 13, 11, 16.	5 months.	Treatment for wound only.	10 days.	Severe aching pain, median area.	Paresis only, little contracture, and atrophy.	All gave responses.	A.C.C. > K.C.C. thenar group, but brisk.
Case 24. W. W. G.S.W. left elbow. 4/3/17.	9 months.	Typical history minor causalgia relieved by blocking nerve with 60 per cent alcohol.	8 days.	Had had typical pain.	Paralysis muscles, due to alcohol.	Nil	A.C.C. > K.C.C., sluggish. No R.D.

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ALLIED PAINFUL CONDITIONS—*continued*.

TREATMENT.						
Vasomotor and Trophic Changes	Mental and Emotional State.	Non-surgical.	Surgical.	Operative Findings.	Post-operative Treatment.	Progress.
Skin dry, nails y, curved, and little, fingers-pering, hand fl and wooden.	Good.	Massage, ioniza- tion, dia- thermy, anodal baths.	Nil.			Much improvement very soon. Parae- sthesia given way to hypo-aesthesia. Full movement of joints not obtained.
Skin sodden- looking, and fish-pink; hy- ridrosis; nail- curved, ridged, d long.	Good.	Nil.	July 2, 1917: Neurolysis right median nerve.	Nerve found bound down in scar tissue and somewhat bulb- ous.	Anodal baths, massage, ioniza- tion, galvanism.	Sept. 11, 1917: No pain, all muscles act- ing. Sensory loss clearing. June 14, 1918: Good hand: no pain, all muscles acting, joints free.
Typical trophic changes well marked.	Good.	Inter- rupted gal- vanism, mas- sage, move- ments.	Nil.			Nerve recovering very slowly from de- vastating effects of alcohol. Few signs of recovery in 12 months, though no pain.

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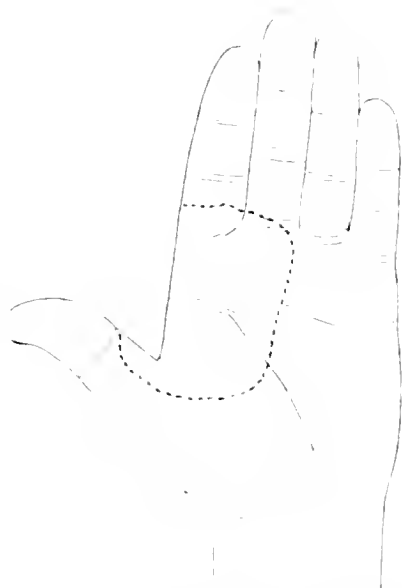


FIG. 1.--Diagram to show the average typical area in which the intense pain is felt in median causalgia.

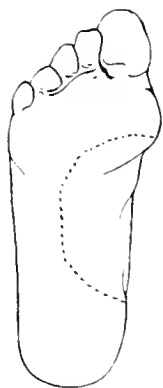
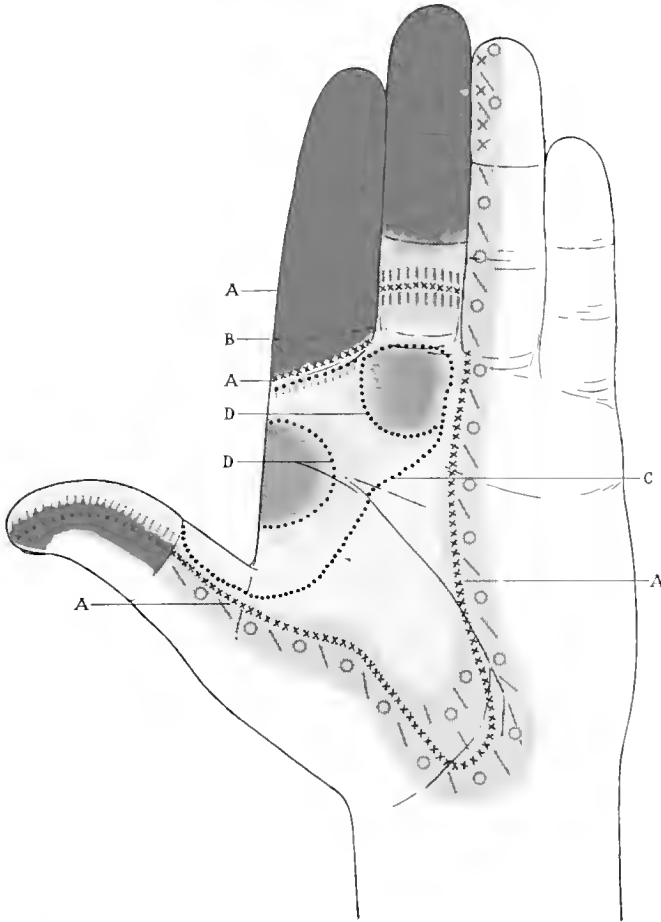


FIG. 2.--Diagram to show the average typical area in which the intense pain is felt in sciatic and internal popliteal causalgia.

Case 1.—Diagram to show:—

- (1) The method of recording sensory loss by means of colours (in practice ordinary coloured crayons are used).
- (2) The sensory disturbances in a typical case of median caualgia.



Red — Total loss of sensation to light touch.

Brown — Hypo-aesthesia to light touch.

Green — Paresthesia and altered quality of sensation to light touch. (Coarser stimulation, of course, also evokes paresthesia in this area.)

Degrees of variations in sensation may be indicated by varying shades of the appropriate colours.

O indicates that pressure causes paresthesia.

X indicates that pinprick causes paresthesia.

\ indicates that coarse scraping causes paresthesia.

(It will be seen that in the whole of the outlying area of hypo-aesthesia both pressure and scraping evoke paresthesia, and that at the tip of the ring finger pinprick does also.)

A = The margin at which pinprick is felt normally. In places (indicated by radiating green lines), paresthesia is immediately evoked.

B = The margin at which pinprick is felt as a blunt sensation: e.g., in exploring the index finger with the spring aesthesiometer (at mark 8), no sensation is evoked until the level of line B is reached, when the feeling is described as blunt. On the second finger, pinprick is felt as blunt all the way from the tip to the line A, when it becomes sharp.

C = Outer dotted line enclosing the typical painful area.

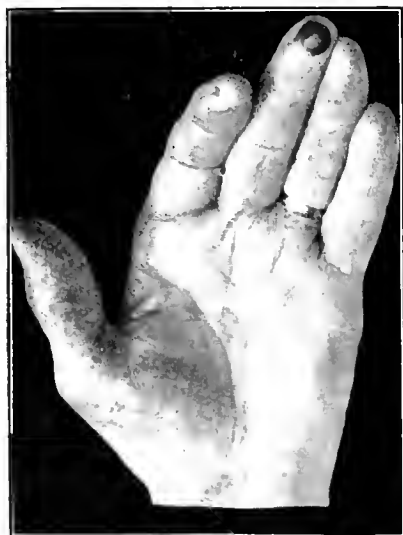
D = Inner dotted lines enclosing the areas of maximum pain and tenderness (dark green).



Case 1.—Typical appearance of hand in median caudalgia. Note conical fingers, overgrown curved nails, trophic changes in skin, and slight contracture.



Case 2. Sole of the right foot in a case of internal popliteal caudalgia. Note the general atrophy of foot in comparison with the left foot, with falling together of the toes and alteration in character of the skin surface.



Case 3. The hand in an old-standing non-traumatic case of median caudalgia. Note the skin surface, the trophic blisters, and a slight degree of contracture.



Case 4.—The hand in a very severe case of median caudalgia, showing the typical appearance of the skin, and the contracture.



Case 6.—Appearance of the hand in a case of minor median causalgia.



Case 10.—Left foot in a case of minor causalgia of the internal popliteal nerve. Note glossy skin over the toes, slight flexor contracture, trophic ulcer and general appearance of skin surface.



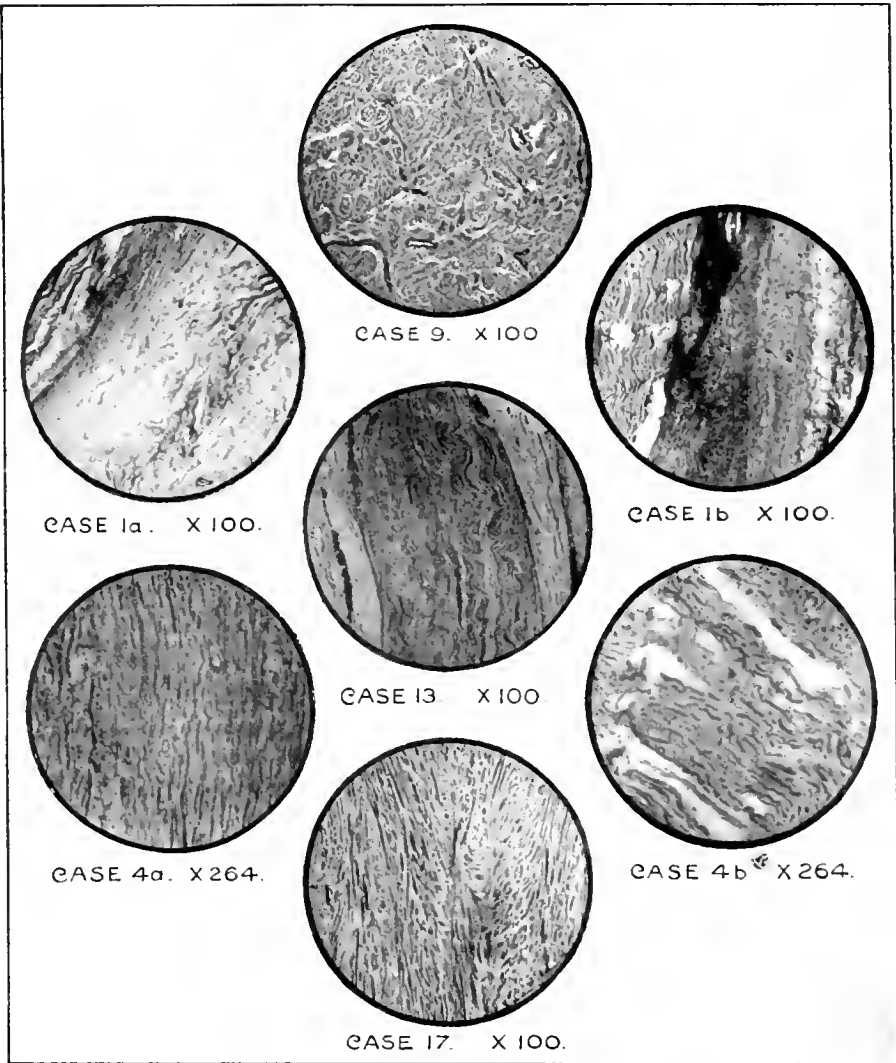
Case 13.—A hand in a case of minor causalgia of the median nerve, with a mild irritative lesion of the ulnar nerve.



Case 24.—Showing a hand in a case of minor median causalgia ten months after the intraneural injection of 60 per cent alcohol. Note the persistence of trophic changes.

PLATE IV

MICROPHOTOGRAPHS OF SECTIONS OF EXCISED PORTIONS OF NERVES



Case 1a, b. Showing intrafascicular and perifascicular fibrosis, with nerve fibrils struggling through a mass of fibrous tissue.

Case 1a, b. Showing intrafascicular fibrosis with breaking up and distortion of nerve fibres.

Case 9.—Excised portion of sciatic nerve cut transversely, showing perivascular fibrosis with compression and obliteration of nerve bundles.

Case 13.—Showing intrafascicular and perifascicular fibrosis with compression and distortion of nerve fibres.

Case 17. Section cut obliquely, showing nerve fibres in a mass of fibrous tissue.

INHIBITION AND EXCITATION IN THE CENTRAL NERVOUS SYSTEM : A PRELIMINARY NOTE.*

By T. GRAHAM BROWN, CARDIFF.

I.—INEQUALITY OF INHIBITION AND EXCITATION GIVEN BY THE SAME REFLEX STIMULUS.

IN such an act as the flexion-reflex, one group of muscles (flexors) contracts, and the antagonistic group (extensors) relaxes—if they have previously been in a state of tonic contraction. Sherrington ascribed this phenomenon to the reciprocal innervation of antagonistic groups of muscles. One single stimulus *excites* an increase of discharge in the flexor motor neurones, and simultaneously *inhibits* any discharge present in the extensor motor neurones. The same stimulus produces central excitation and central inhibition, but in antagonistic motor neurones.

The question whether the excitation is equal to the inhibition (that is, whether the excitation produced in one group of motor neurones is equal to that which the inhibition can just overcome in the antagonistic group) is a fundamental one. Sherrington¹ and other workers have assumed that this equality obtains. If two *antagonistic* reflexes (flexion and extension) are pitted against one another to give a compound reflex, the resultant is intermediate between the two—Sherrington's 'algebraic summation' of flexion and extension in the compound reaction. Each group of motor neurones is then acted on by both excitation and inhibition—by the excitation produced by one stimulus, and the inhibition produced by the other.

Let us assume that the excitation equals the inhibition given by each of the stimuli. The excitation of one stimulus is met by the inhibition of the other in the same motor neurone (or group of motor neurones). Thus, where *that* excitation and inhibition are equal, there must also be equality between the inhibition and excitation in the *other* group of motor neurones. (Things equal to the same thing are equal to one another.) In other words, where the strengths of stimuli are such as to give exact suppression of excitation in one group of neurones, they must also give it in the other. At all

* From the Physiology Institute, Cardiff.

other strengths of stimuli, the excitation will overcome the inhibition in one group of motor neurones, and the inhibition will more than suppress the excitation in the other.

Thus simultaneous discharge should not be seen in the two antagonistic groups of motor neurones during a compound reflex if exact equality occurs between the inhibition and excitation given by the same reflex stimulus.

But simultaneous contraction may occur in both sets of antagonistic muscles during a compound reflex. Therefore simultaneous discharge may occur in the two antagonistic groups of motor neurones. Therefore the excitation and inhibition given by the same stimulus are then unequal. The facts of the case necessitate that the inhibition shall then be less than the excitation at any rate in the case of one stimulus. The invocation of an additional 'tonic' discharge does not alter the argument.

II.—THE VARIATION OF INHIBITION.

The value of inhibition may be measured by its effect in reducing the size of an antagonistic excitation—by the relaxation of an antagonistic contraction. (Thus a flexion-reflex inhibition reduces the extensor contraction against which it acts.)

My measurements show that the value of inhibition is relatively less in the extension-reflex than in the flexion-reflex where double contraction occurs in compound reflexes. The ratio of inhibition to excitation is less for extension-producing stimuli—they are the milder of the two. This relationship is also shown by the fact (Sherrington) that a maximal flexion completely overcomes a maximal extension.

This is one aspect of the variation of inhibition—it is relatively less in extension than in flexion. Another aspect is the variation in either case with change of intensity of stimulus.

The inhibition given by a series of reflex stimuli is more intense when the stimuli are more intense, and less intense when they are mild. The inhibition which accompanies great flexion is greater than that which accompanies slight flexion.

But a third aspect is presented by the possibility that the *ratio* of inhibition to excitation may change while both of them increase or decrease in absolute value. This variation has not yet been described.

If an extension of fixed intensity is pitted against different intensities of flexion, it should give the same amount of relaxation in each case—provided the inhibition in the constant extension is itself constant.

As a matter of fact the relaxation is less where the flexion is

greater. Therefore the relation (ratio) of the inhibition to the excitation given in extension varies with the intensity of the flexion against which it is compounded. This variation may be expressed by saying that, in the extension-reflex, the ratio I : E (inhibition to excitation) varies inversely with the excitation against which the inhibition is pitted (or, more widely, inversely with the intensity of the antagonistic flexion-reflex).

If different intensities of flexion are pitted against a fixed extension, relaxation of different degrees occurs in the extensor muscle. This measures the inhibition in the flexion-reflexes. It should be a fixed proportion of the contractions in the simple flexion-reflexes which are used in the compound reflex, if the relation between inhibition and excitation is the same at all intensities of flexion.

It is found in actual experiment that the extensor relaxation is proportionally greater the more intense the flexion is. Therefore the relation between inhibition and excitation varies with the intensity of the flexion-reflex. This is expressed by saying that the ratio I : E for the flexion-reflex varies directly with the intensity of excitation in the flexion-reflex itself.

Therefore inhibition does not remain the same ratio of excitation at all intensities of flexion and of extension. The ratio varies in the case of flexion with the intensity of flexion itself: and in the case of extension it varies inversely with the intensity of the flexion against which it is pitted in a compound reflex.

This variation is perhaps of fundamental significance.

REFERENCE.

- ¹ SHERRINGTON, *Proc. Roy. Soc., B*, 1913, LXXXVI, 219.

PSYCHOPATHOLOGY AND THE THEORY OF PSYCHOPATHIC (GERMINAL) INHERITANCE.

BY I. D. SUTTIE, GLASGOW.

IN the psychological interpretation of a mental disease such as paranoia we are under the necessity of explaining the statistical fact of its high familial incidence. For the physico-chemical interpretation, however, the heritability of 'delusional insanity' presents no difficulty: indeed, in the absence of any specific histopathological findings, any characteristic lesion or abnormality whatever, the evidence of its inheritance is the only empirical ground for assuming in this mental disease a structural basis determined otherwise than by function. Since there is physical but not psychical continuity between successive generations, it might be argued that structure alone is transmitted: so far as morbid inheritance is proved a significant factor in the etiology of the neuroses, to the same extent the psychological etiology will be invalidated.

In this way the question of inheritance becomes crucial for psychiatry. Those diseases which are fatally determined *ab ovo* must have a purely 'organic' development (pathogenesis), must be studied and formulated 'physically': effective treatment (if any such be imaginable) must follow the same lines, and it would appear that prophylaxis is limited to eugenic measures. If the germinal cause be *necessary*, but not in itself *sufficient*, then prophylaxis or treatment that preserves the individual without diminishing his fertility (or at least limiting it in certain directions) will defeat its own ends by disseminating the predisposition through the population. In so far as we attribute pathogenic efficiency to a germinal abnormality (always hypothetical), we limit the significance of 'trauma'. By solving the etiological problem in this manner we decrease the value and interest of the study of disease: by emphasizing the importance of germinal determination (morbid), and hence of inherited *structure*, we assign a superficial rôle to psychological interpretations. This would not further our understanding of the phenomena of paranoia and the neuroses.

It should be noticed that those diseases with mental symptoms in which an hereditary transmission has been most clearly made out, are precisely those in which the organic basis is most obvious.

The ideal of psychopathological interpretation is the formulation (from the standpoint of both experience and behaviour) of the nature and development of the morbid condition under its consideration, and the reference of abnormalities to traumata (in the widest sense) acting through the sense organs (i.e., by normal afferent channels) and not, by physical or chemical means, directly upon nerve tissue. Fundamental, endogenous abnormalities of disposition are subjectively unintelligible: they could not be appreciated by the patient or communicated to the doctor, since each interprets mind in terms of his own, and words exist only for trans-subjective meanings. The subjective evaluation of innate disposition is then impossible (except by exclusion); behaviour gives at best a rough *quantitative* indication of this; and it is obvious that psychopathology cannot assimilate the 'individual' and the 'innate' into its causal sequence. It is concerned with abnormal *modifications* of thought and conduct due to abnormal experience, and its objective is to complete as far as possible this causal explanation, deducing therefrom rational prophylaxis and treatment.

So far as *values* and qualitative experience generally are concerned, we have no resources but the current psychological conceptions interpreted in terms of our own experience. By what other vehicle than terms of accepted meaning can the patient communicate to us his thought processes? He has no standard of comparison to enable him to appreciate his abnormality: even if he had a supernaturally acquired insight, he has no means of imparting to us an appreciation of any qualitative differences between his mind and ours. Only in so far as minds are similar can they develop (since development is a social process): only in so far as they are similar can they be scientifically studied and understood. Even could psychological analysis delve down (subjectively) to the bedrock of inherited tendencies, etc., it could never satisfactorily generalize these, could never make of them a scientific pathology.

For the psychopathologist, then, a patient is a potentially normal mind whose feelings, beliefs, attitudes, interests, and other reactions have been warped by abnormal experience. To an understanding of trauma and pathogenesis he looks for prophylaxis and therapy. The innate and the individual are an irresolvable residual which represent the limitations of his method. He is concerned to criticize the genetic interpretation put upon the familial incidence of mental diseases. For those diseases whose transmission is proved to be physiological he must abandon etiological research; where proof is wanting he must insist on the question remaining open.

I think it is sufficiently obvious that where transmission of any disease with mental symptoms is proved to take place through the

mechanism of physical heredity, the physiological interpretation of that disease starts with a fundamental advantage—the certainty that its method is valid. On the other hand, in studying these diseases psychopathology must take account of a fact that is outside its ‘universe of discourse’.

Here, then, in the mode of inheritance of any particular mental disease, is a criterion which will enable us to choose our line of research, which might save the psychopathologist a fruitless task. If the disease is inherited by physical channels, its fundamental cause and nature are physical. Psychological formulation is secondary and superficial; psychotherapy at best a palliative; mental hygiene, as I say, a means of propagating unsound stock. Both theoretically and practically, then, it is a matter of fundamental importance to attain definite knowledge of the validity of the interpretation of the facts in terms of physical heredity, and whether there is any possible alternative interpretation.

Failing organic defects or stigmata whose correlation with innate defect of mind is completely established, the only positive proof of an organic transmission of mental characters would be a ‘Mendelian’ distribution among offspring. The noteworthy attempt of Davenport and Weeks to demonstrate this has been criticized by Mott himself, and we will here only remark that it is fully made out only in those diseases whose ‘organic’ basis is otherwise fully manifest. Unless such a ‘specific pattern’ is demonstrated, statistics can show only a connection between cases, and it seems worth while to consider what alternative causal connection (to the *germinal* one) can exist. For the purposes of this inquiry we can accept the statistics of familial incidence without criticism, being merely concerned to show all possible causal connections between cases of mental disease, other than hereditary transmission and physical infection.

It is obvious that if *trauma* is here of any etiological importance, *exposure to identical traumata* must be a factor in certain ‘bad family histories’. Unless the ontogenesis of mental disease be denied, it must be admitted that environmental causes themselves tend to produce a grouping of cases within certain families, in excess of theoretical expectation. That is to say, the incidence will not be ‘random’: in the absence of all causal connection between cases, physical or psychical, statistics would still show a tendency to *family* grouping; by bearing on each generation in turn, such traumata as those arising from poverty and bodily weakness or deformity will tend to produce a succession of mental troubles within the family simulating inheritance.

For psychic characters other channels of transmission exist than the mechanism of physical inheritance. A child’s imitation of

mannerisms, standards, and judgements is notorious. Its suggestibility is not merely positive; even the simple organic appetites are profoundly modified by upbringing. Interests, ambitions, sense of value and 'proportion', 'common-sense', 'moral' sense, sociability (or at least attitude to and interest in one's fellows), habits of industry, occupational 'bent', skill and capacity, tastes, enjoyments, hobbies, amusements, to say nothing of the capacity for clear and independent thinking and for controlling conduct in accordance with decisions so arrived at—all these are mainly acquired. Yet these practically *form* character and disposition; a healthy balance in these is mental health. Of course it will be argued that the 'predisposition' interferes with the establishment of these mental qualities, etc. This must, however, be proved in general, and not merely assumed in regard to those cases which eventuate in psychoses, etc. It may be accepted, however, as certain that upbringing, as distinct from trauma, has much to do with mental stability or psychopathic predisposition, quite independently of our opinion with regard to the Freudian etiology, the psychic traumata of infancy, etc., and the pathogenic potentialities of certain family relationships.

All these considerations indicate the importance of such ontogenetic factors as, e.g., parental disagreement, irritability, or over-indulgence; the presence of a neurotic, psychotic, or defective member in the child's immediate environment. The family 'tradition' or 'atmosphere', its interests and amusements; its resources for occupying and developing rather than repressing the growing mind; play, games, books, companionships, social ideals and customs—all have a hygienic or pathogenic effect which *is limited to the family and therefore expresses itself in statistics in a way indistinguishable from (non-Mendelian) inheritance*. That is to say, that, whatever their influence for good or evil, these factors affect families as wholes (to a large extent), thus making character, tastes, disposition, ability, temperament, and mental stability to some extent *acquired family characters*. Only the specific *pattern* of a Mendelian distribution (by indicating a chromosomal determinant) will demonstrate unequivocally a physical rather than this psychic transmission. Hence the significance of the work of Davenport and Weeks. Failing the proof of this, the alternative is a suspension of judgement pending an evaluation of the psychic factors.

I have attempted to show that the neuropathological theory of mental disease is associated with the hypothesis of its hereditary transmission. I think even that the two lend each other 'moral' as well as logical support. I have also indicated that the crucial test of the ultimate validity of psychopathological interpretation is its ability to account for high familial incidence of the disease-form to

which it is applied. If one might hazard a tentative judgement on these lines while presuming an agreement upon the evidence, one might say that as certain mental syndromes have no typical or integrated psychic aspect, but have, on the other hand, a demonstrably organic basis, we must infer that any hereditary relation is physical, and *mutatis mutandis* where no neural lesion or abnormality is discoverable. Thus mental defect, as we know, is heritable; the psychoses are questionably so, with the exception of paranoia, which with the minor and anomalous neuroses are probably acquired.

SOME CONSIDERATIONS ON THE TREATMENT OF SPASTIC PARALYSIS.

BY R. G. GORDON, BATH.

CONSIDERABLE misconception still seems to exist with regard to the treatment of upper motor lesions, and it is all too common to have patients sent into hospital suffering from some form of spastic paralysis, who give a history of having been ordered long courses of massage and electricity. It would seem that for many doctors the word 'paralysis' is intimately associated in their minds with the words 'massage' and 'electricity', and they apparently do not remember what these two admirable therapeutic measures are supposed to do. The passage of a series of interrupted currents through a muscle causes the muscle to contract, and in so doing shortens the fibres of that muscle. Sherrington pointed out that a muscle at rest is not a muscle completely relaxed. He demonstrated that the ordinary resting length of a muscle was maintained by a partial contraction of the fibres which is called 'tone', and which depends on the integrity of the spinal reflex arc. If this arc is interfered with, the muscle loses its tone, and the fibres lengthen into their position of complete relaxation. In the higher animals, however, this postural tone of a muscle at rest does not depend on the spinal reflex only, for if the spinal reflex is cut off from its connections with the cortex, its tone is at once altered, and it is found that its tonic contraction increases so that the fibres become shorter. When an animal is operated on so that all connections with the cortex cerebri are cut off, certain muscles retain their tone provided the reflex arc is intact, at any rate after the first shock of the operation or disease had passed away. At first the whole spinal cord is so much affected, that the spinal part of the lower arc is interfered with and all muscles become atonic. In cases in which the spinal arc is isolated from its cortical connections, the tone is not the same as in normal conditions; and when disease or injury cuts off the spinal arc from communications with the cortex, we find that the tone in some muscles is increased, and that these muscles are the ones which are concerned in maintaining the normal erect attitude of the animal, i.e., the ones which counteract gravity. This tonicity of the muscles depends both on the spinal arc and on the integrity of another arc, the pre-spinal motor system.

When the spinal arc is separated from all the higher levels there

is no tone, but there may be activity. It is only recently that any work has been done in human beings to illustrate what happens when the spinal are is left intact. The reason of this is that an injury so severe as to cut off complete connection with the brain, but retaining the connection of the limbs with the cord, is almost always quickly fatal. Head and Riddoch, by great attention to their patients, were able to ensure their survival, and found that, whereas in spinal animals activity was retained by the extensor group of muscles, so as to produce what is called an extensor thrust on stimulation, in man the activity is found to be retained for the most part in the flexor group. This may be explained as follows: One of the most primitive reflex actions an animal can exhibit is the drawing up of a limb or part of the body out of harm's way, and this involves action of the flexor muscles, so that for this purpose activity of these muscles is necessary. In man the spinal are subserves this reflex chiefly, the reflex-action maintaining attitudes to counteract gravity, being almost entirely taken up by the pre-spinal system. In spinal animals, however, the spinal are still has to perform this duty of counteracting gravity; hence the activity in the extensor muscles. Under such conditions of isolation of the spinal are no voluntary movement at all is possible, but reflex movements may still be induced by stimulating various parts of the skin. This spinal reflex are is controlled by higher are in the nervous system, and these belong to two great motor systems. Their action is to modify tonicity so that when either of them becomes negative by being cut out by disease, the spinal are is left to itself and released from control, so that the muscles become hypertonic.

We must now consider these two motor systems, and they are interesting inasmuch as they correspond to the evolutionary change in the development of animals. Where an animal depended on more or less undifferentiated movements of a limb, such as is the case in the movements of the fin of a fish, it is found that only the older, or, as it is called, the pre-spinal system, is fully developed. This is concerned with the position of the animal in space, and with more or less indiscriminated movement. The other—the cortico-pyramidal system—is developed when the various parts of the limb have got to be used separately and discrimination established between the movements of the various groups of muscles. These facts can be illustrated by observing the effect of cutting out either of these motor systems. In some diseases the pre-spinal motor system is cut out, and in that case the spinal are is under the control of the cortical system only, so that the tone and mode of action is modified. This pre-spinal system is composed of fibres which travel from the connection of the spinal are up through the cord, and proceed by relays through the cerebellum and certain collections of cells, the most important of which is the

red nucleus, and down again through the cord to the anterior-horn cells of the spinal arc. It is not proposed at present to deal with the treatment of diseases interfering with this tract, or with both pyramidal and pre-spinal tracts.

When the pyramidal system is cut out it means that the pre-spinal and spinal arcs are allowed free play, and we find that certain muscles and groups of muscles will, as a result, show marked hypertonus, in consequence of their freedom from the control of the discriminating influences of the higher system. This higher system consists of relays of fibres passing up from the spinal arc to the cortex of the cerebrum, then down from the motor areas by the pyramidal tracts to the anterior-horn cells of the spinal arc. Interruption of this arc is seen in hemiplegia or spastic paraplegia due to interruption of the pyramidal fibres, and in certain wounds of the head which destroy the cells in the motor area. In these diseases we find that all the muscles connected with the retention of the erect attitude will be hypertonic: and this will be found to involve practically all the muscles of the limbs, but specially the extensors: this is apparently untrue in the upper limbs of man owing to their altered function as a result of their being freed from the duty of locomotion: but this does not alter the general law.

In man, the arms are primitively used for grasping, embracing movements which require the action of the flexor muscles, and hence we find that they are the ones which become hypertonic. As a result of this hypertonicity and the loss of discrimination in movement, the limb moves as a whole in a stiff spastic manner and the patient cannot execute fine movements, such as writing.

From the above, however, it is evident that in cases of spastic paraplegia muscles are already hypertonic, and further stimulation by electricity or massage, as usually given, will increase their tone and make matters worse. It may be admitted at once that in long-standing cases of hemiplegia certain muscles which are overcome by the hypertonic groups become wasted and atonic, and in such cases massage to these muscles may be useful, providing great care is taken in estimating which are the atonic muscles and only dealing with these: for it frequently occurs that a limb may be wasted from disuse, and certain muscles appear small which on investigation are found to exhibit intense hypertonicity. In these cases electricity is always contra-indicated, as it is impossible to confine the action of the current to the atonic muscles, for it will always spread through and throw the hypertonic muscles into action.

A very important point in the treatment of spastic cases is, by the use of proper splints, to prevent the weaker muscles being stretched and rendered atonic. Contractures are the result of neglecting

this precaution. Splints at first should be used all the time, but later may be discarded during the day. They should be made of some light material, and various forms have been found useful. Where contraction has already occurred, a light celluloid splint moulded to the limb, which can be padded to extend the fingers of the hand gradually, is useful: but where there is only a tendency to contraction, the most useful type of splint for a hand would seem to be a leather gaiter tightly fitted over the forearm, and moulded to reach the heads of the metacarpals held in a slightly extended position. Five steel springs are fastened to hooks attached to the back of the gaiter at the level of the wrist, and are fixed to other hooks on corresponding leather finger-stalls, fitting over the 2nd and 3rd phalanges of the fingers and the 2nd phalanx of the thumb. In this way the fingers tend always to be held in extension, but can be flexed for such movements as the patient is capable of. The difficulty with more fixed splints is that, although the patient is capable of flexor movements, he cannot get his fingers out again, and the springs will do this for him. Where there is marked paralysis of the supinator muscles with consequent hyperpronation of the forearm, an extension of the splint above the elbow may be used. This is supplied, as suggested by Dr. Carleton, with a universal joint, which can be screwed up tightly in varying positions of supination so as gradually to relax the spasm of the pronators. For the dropped and inverted foot which is so frequently met with in spastic paralysis, most success has been attained by a simple leather gaiter fitted to the leg, attached to the top of which are two springs, one fixing to a loop in the centre of the boot over the heads of the metatarsals, the other to the outside of the boot at the level of the fifth toe. With this help the hemiplegic can often walk with fair comfort, provided he learns always to step off with the weak foot and not bring the good foot too far forward. In this way he prevents the toe scuffing the ground in an effort to bring it forward when left behind.

So far as active treatment is concerned, it is essential to attempt to induce relaxation of the hypertonic muscles and encourage the action of their opponents. On general principles, if the lesion is at all severe, treatment of the hand is very disappointing, and where there is a loss of sense of position of the fingers, any attempts are practically hopeless. Where, however, contracture has been prevented from going too far by appropriate splints, and there is not too great interference with the discriminated movements of the various groups of muscles, a good deal can be done. The first essential is to encourage the patient to make the effort to move his fingers, and nothing will bring this about so well as an actual demonstration that they can be moved with moderate freedom. If the hand is placed in as hot water as can

be borne, either in a whirlpool bath or in an ordinary hot-water bath, and the patient is encouraged to make his movements while in this bath, much progress will be made. At first the efforts at movement may be helped by judicious passive movements on the part of the masseuse, but it can never be too strongly impressed on both the patient and the masseuse that the hand is not being placed in the hot water simply to cook, but to work. Too often one finds a patient dangling his hand in a bucket of hot water, reading the paper, or carrying on more or less interesting conversations with his masseuse. This is an utter waste of time and water. Directly there is any possibility of such movements being carried out, the patient must be got to do things with his injured hand. Writing, using a fork, doing up his buttons, modelling with plasticine or clay, should all be systematically taught, and it can never be impressed on the patient too much or too often that the disablement of his hand is the reason for using it, not for leaving it hanging by his side. This treatment will do good even in cases which are entirely organic; but there is almost always a functional element added to the disability, arising from the conviction in the patient's mind that his hand is of no use. The active treatment will remove this, and will even improve the organic condition in an astounding way. This is especially the case where the injury has been cortical, from accident or gunshot wound, and where the area actually destroyed is often small, although there has been widespread disablement owing to the temporary oedema of the cortical tissue.

With spastic paralysis of the leg much more can be done. A patient can get about even though his gait is clumsy, and the absence of finer discriminations of movements are not so important in the lower limb as they are in the upper. The same principles must be adhered to, relaxation and re-education, and again hot water is a most useful adjuvant. In the case of the lower limb, however, hot water is not so easily supplied because in the ordinary bath there is not sufficient room for free movement. As is well known, the adductors are the muscles which are chiefly under spasm, and there is never enough breadth in the bath to overcome this by proper movements. As a rule it is difficult to get a large enough bathing-place with sufficiently hot water, as the water must be at the temperature of 102° – 104° to be of any use in relaxing spasm. I have been fortunate in being able to give this method of treatment a good trial in Bath, because we have a bath some 30 ft. square and 4 ft. 6 in. deep, in which the water comes up at the natural temperature of 104° . This gives an absolutely ideal exercising ground for patients with spastic paralysis of their legs. At first the patients are supported in a sling from the roof consisting of three bands, one passing under the occiput, another

under the arms, and the third under the hips. This can be raised or lowered by means of a pulley, so that a perfectly helpless patient can have his limbs immersed in this hot water and yet retain his head comfortably above it. Passive movements of his legs are carried out, and he is encouraged to kick out in any direction he can. Two advantages are gained: first, the hot water relaxes spasm to a maximum; and secondly, the action of gravity is counteracted, owing to the support given to the limb by the water. Patients who have been practically unable to move their legs in bed are very soon able to execute quite strong and agile movements in the water. As they improve, the slings round the hips and the head are removed, and, supported by the attendant and the sling round the arms, they are encouraged to stand and start walking movements. Soon they dispense with the sling altogether, and walk round the bath supported without difficulty by the attendant. Exercising in this hot water is hard work, and should not be persisted in for more than twenty minutes, and probably not more than three times a week. Experience has shown that a course of about fifteen to twenty baths is sufficient. In one case which is quoted below, which was that of a robust patient, and in which I went on as long as improvement resulted, over 100 baths were given, more or less continuously. By this time he was complaining that his muscles were getting weak and that he was easily fatigued, but within a fortnight after stopping them he was better than ever.

As in the case of the hand, the intelligent co-operation of both patient and attendant is necessary. Merely lying in the hot water will do no good, and a great deal of the success depends, first on the desire of the patient to co-operate and to get well, and secondly on the personality of the attendant, who should give the encouragement that is needed. It is not claimed that this hot-water swimming bath is a specific for the treatment of spastic paraplegia or hemiplegia: but where it can be carried out easily, with sufficient room and sufficiently hot water, I have no hesitation in claiming that it is the ideal way of dealing with this common and rather wearisome disability.

The following cases illustrate the use of this method of treatment:—

Case I.—Disseminated sclerosis.

A. V. M., age 29. Wassermann recorded as positive in 1918, but the condition was made worse by salvarsan treatment. Wassermann negative on admission, when he was walking with crutches, with marked spasticity and difficulty of separating feet. Usual symptoms of disseminated sclerosis. Was discharged from hospital able to walk with one stick, and to undertake clerical work.

Case 2.—Gunshot wound of spine at level of 8th dorsal vertebra.

A. M. V., age 26. Marked weakness of lumbar muscles, for which he was given spinal support. On admission could walk about a hundred yards. On discharge could walk nearly a mile. Capable of sedentary work. Went home to South Africa.

Case 3.—Disseminated sclerosis.

W. G. K., age 34. Usual symptoms, with spastic ataxic gait. Gait improved to a certain extent, but disease progressive, and improvement was not maintained.

Case 4.—Hemiplegia after diphtheria.

R. M., age 20.—Usual signs of hemiplegia. Arm was much improved. After treatment he was able to hold a fork, could feed himself well, and just sign his name. Gait considerably improved, but his general condition was poor. Was never able to walk very far.

Case 5.—Gunshot wound of spine of 10th dorsal segment.

W. F. C., age 24. Marked spasticity, with scissor gait. On discharge could separate his feet 22 in., and could get into the upright position, though with difficulty. He could walk by himself for short distances, which had been impossible previously.

Case 6.—Hemiplegia, the result of a stroke.

T. B., age 44. Considerable amount of osteo-arthritis. Treatment improved his walking slightly, but he was discharged very little relieved.

Case 7.—Typical case of disseminated sclerosis, with markedly ataxic spastic gait.

S. J. H., age 22. Although disease was definitely progressive when admitted to hospital, he improved considerably later, the gait becoming less ataxic and less spastic. Still under treatment, and is now able to walk nearly half a mile, with difficulty.

Case 8.—Spastic paraplegia following myelitis.

G. L., age 46. Admitted to hospital bedridden. Unable to separate his legs at all. Being a robust man, he continued having baths and re-education while improvement persisted, and eventually had over a hundred baths. Can now walk five miles and separate his feet 30 in., and, with support, 53 in.

Case 9.—Gunshot wound of spine in 5th dorsal vertebra.

W. W., age 29. Admitted with extreme spasticity and severe pains. As a result of prolonged treatment spasticity has enormously improved. He can walk for a mile, and has very little pain. Can separate his feet 29 in.

Case 10.—Disseminated sclerosis.

T. D., age 37.—Improved with treatment. The spasticity decreased, and the patient is shortly going to start on sedentary work.

Case 11.—Disseminated sclerosis, with marked mental deficiency.

J. W. B., age 31. At first improved enormously under treatment, so that from being practically helpless he was able to walk relatively well. Suddenly, after absence from hospital during Christmas, he relapsed,

developed bed-sores, and was unable to stand. Still under treatment, and is again improving.

Case 12.—Attack of (?) spinal encephalitis lethargica.

M. A., age 46. May, 1921: progressively developed symptoms simulating disseminated sclerosis till July, 1921, when she began to improve. Signs of pyramidal interference were still present, with loss of sense of position. Progress was very slow till the end of November, 1921. She was got up on crutches and began the hot-water swimming bath. From then progress was rapid, and in January, 1922, she was able to walk with two sticks for 300 yards. Still lacks the sense of position of legs, but there is comparatively little spasticity. Plantar reflex had previously been extensor, but has now become flexor.

Short Notes and Clinical Cases.

ERYTHROMELALGIA, CAUSALGIA, AND ALLIED CONDITIONS.

BY SIMON KELLY, MANCHESTER.

IN considering this group of conditions the following case presents many features of interest.

A pensioner, A. T., age 41, came under my care on Jan. 17, 1921, complaining of continuous severe burning pain in both hands, and pain and swelling of the left leg and foot. The pain in the hands was so severe as to render them quite useless, being aggravated if he touched anything dry; and he constantly held wet rags in his hands. In the left leg and foot there was a continuous dull pain; and if in the dependent position, or on walking, there was considerable swelling.

On Examination.—The patient was a well-nourished man of excellent physique. The hands were blue, cold to the touch, and somewhat swelled, pitting on pressure. The discoloration was sharply demarcated at the wrists, the discoloured parts only being painful. The skin was glossy and the nails were thin, the blue colour showing through. The hands were tender, the patient resisting any attempt to touch them. The pain was not affected by movement or by the position of the limbs. On his being persuaded to undergo examination, sensation was found to be normal—heat, cold, pain, tactile, and two-point discrimination tests being used. All movements were normal.

The left leg and foot were œdematous below the knee, particularly round the ankle and in the plantar region at the roots of the toes. There was no discoloration, the skin and nails being normal in colour. On touching the foot there was some tenderness, which was severe on the sole, interfering very much with walking. The whole limb was slightly atrophied, the calf, thigh, and buttock being affected. The only limitation of movement was of dorsiflexion of the ankle. Sensation was normal.

The knee-jerks were brisk but equal. The other reflexes, super-

lacial and deep, were normal. The left pupil was slightly larger than the right, but there was no other abnormality. The pulse-rate was 110 per minute. The urine was normal. The electrical reactions of the muscles were normal. X-ray examination of the left leg and foot on March 30 showed "atrophic changes in the lower half of the tibia and in the bones of the foot". The mental condition was good. The patient was cheerful. There was no depression or 'nervousness'. Sleep was good.

History.—The patient is an old soldier who served in the Boer War, when he received a gunshot wound in the right calf which soon healed and has given no trouble since. While serving in India he had a slight attack of malaria, which also has never given rise to any trouble since. (Blood taken from one of the fingers of the left hand and examined microscopically showed no abnormality.) He was perfectly well till Aug. 26, 1914. On that date he received a superficial bullet wound over the external condyle of the left femur, two inches above the situation of the external popliteal nerve. The injury was merely a skin wound an inch long, and bled profusely. On receiving it he "felt a sharp pain shoot down from the knee to the heel and burst there all over the foot". He collapsed and was made a prisoner. After a few days there was no discomfort of the left leg.

While a prisoner in Germany, on three occasions within about four months he received the following atrocious punishment for petty offences. It consisted in being pegged down in the snow, flat on his back, with his hands above his head, for four hours daily for three consecutive days. He was secured to the ground by means of ropes attached round the wrists and ankles, and to pegs driven into the ground. The hands were entirely uncovered. He was able to move the wrists on first being pegged down, but after some time the ropes tightened and constricted the wrists. This was particularly so on one occasion, when "the hands ballooned up and felt they would burst". Following this treatment, the hands became blue, cold, and puffy, from a sharply demarcated line where the constriction had occurred. They constantly 'burned' all over, and he was unable to tolerate heat or dryness with them, or handle anything dry. He had constantly to keep wet rags in the palms, and periodically to put the hands into cold water. The left leg became painful, and swelled on walking or on hanging down. This state had persisted since the winter of 1914-15, but summer weather or heat had always aggravated the pain and swelling, while cold weather had slightly ameliorated the condition.

In the interval between 1914 and 1921 he had had treatment in Switzerland. This had included electrical treatment, thiosinamine injections, and various drugs, all of which had had no effect.

Treatment.—This apparently hopeless case has responded in a remarkable and gratifying manner to treatment. In January and February, 1921, he was given, on six occasions, suggestions under hypnosis that the pain would leave the hands and left leg, and that he would be able to use them normally. There was progressive improvement in the condition of the hands: and in fact, on this form of treatment being discontinued at the end of February (he has not been hypnotized since), he had full use of the hands. They were no longer tender, and the blueness had given place to a red discoloration which was not sharply demarcated at the wrist, being more obvious in the fingers and gradually shading off to the normal colour in the hand. During last summer—an exceptionally hot one—he had very little trouble on account of the hands, only exceptionally in hot weather having to use a wet rag because of some discomfort.

As to the left leg, the sole became much less tender, and, accordingly, the gait better; but the leg continued to swell to a tremendous amount on walking. In April, 1921, a course of calcium lactate was tried, but this had no effect. Following this an elastic stocking was supplied, and the patient was given extract, thyroid, siccum (gr. $1\frac{1}{2}$ a day). Since then there has been further progressive improvement. The pain in the foot, though persisting, is now very slight, and even on walking considerable distances without his elastic stocking there is only a little oedema. The pulse-rate also, on the administration of the thyroid, fell gradually to 96, at which it has remained. On Oct. 4, 1921, the left leg was again x-rayed, and the report was: "Slight though definite improvement in the condition of the tibia and tarsals".

The present condition is: The fingers are more red than normal, the discoloration shading off gradually in the hand. The nails still look thinner than normal. There is no tenderness or coldness to touch. The patient does not complain of any pain, and uses the hands normally. On warming them in front of a fire he complains of discomfort owing to 'tingling'. Sensation is normal. In the left leg there is still slight continuous deep-seated pain and a little oedema. No tenderness is complained of. All the movements are normal.

Remarks.—I have described this case in such detail, not only because of the extraordinary history and the unorthodox methods adopted in treatment, but also because of its bearing on the theories of the pathology of erythromelalgia and similar conditions.

The condition of the hands conformed in every particular to that described by Paget and Weir Mitchell, and named erythromelalgia by the latter in 1898; except that the symptoms were not made worse by the parts hanging down. Weir Mitchell suggested as a cause peripheral neuritis; others (e.g., Lewin and Benda) ascribe the

origin to the cerebrospinal axis, and Cassirer to the sympathetic system: while more recently it has been ascribed to changes in the walls of the smaller arteries. This last has been described in a number of cases (Barlow, Batty Shaw, and Parkes Weber). In the case described, the only condition that would give rise to the symptoms and their disappearance is a vasoconstriction of the arterioles of the hand. The radial arteries throughout presented no abnormality. This raises the question as to whether, in such cases as are described by Barlow and Batty Shaw, the initial change was a vasoconstriction, with organic changes supervening later. That we do get organic changes secondary to impaired function, whatever the origin of the impaired function, whether physiogenic or psychogenic, is, I think, generally admitted. The progress of the case described suggests that, in the cases which have been subjected to microscopic examination and in which considerable thickening of the arteries is described, we may have a secondary organic change supervening on a chronic vasoconstriction.

The similarity of the condition of the hands to that described by Head as 'glossy skin' is very noticeable. This symptom group, consisting of persistent hyperæsthesia and trophic disturbances of the skin, is ascribed to nerve irritation, following a partial nerve lesion. In this case there had been no such lesion, the condition following exposure to cold and constriction of the wrists.

The left leg presented a very different appearance from that of the hands. The condition was one of angioneurotic œdema without vasomotor phenomena, but with tenderness and bone changes. The origin is rather more complicated than in the case of the hands, because of the wound over the external condyle described above; the fact that the changes were also proximal to the ankle where the constriction had been applied; and because the exposure had not been so extreme or the constriction so severe as with the hands. The patient had woollen stockings on the feet when exposed, and had never felt the constriction so severely round the ankles as round the wrists. Again, only one leg was affected, and that the one which had not long before been slightly wounded.

The history of a pain shooting down a limb and then radiating out ('bursting') is often obtained in wounds of a limb in which there is injury to a nerve. In this case, the site of the wound precludes the possibility of any nerve lesion as a direct result of the wound. A frequent sequel in cases of nerve injury is causalgia (thermalgia of Stopford), i.e., a constant severe burning pain such as my patient had in both hands where he had not been wounded, but which was absent from the foot. Atrophy of the bones has been described also in cases of partial injury to peripheral nerves (e.g., Goldscheider).

This has been shown (by Raymond and Onanoff) to be reflex in nature, depending on irritation of afferent nerves, and not to occur in the rabbit if the limb is subjected to irritation after the division of the posterior roots. The correspondence between these traumatic cases and those produced by tabes and syringomyelia is commented on by Turney. But, again, in the case described there is no evidence of either nerve lesion or central trouble. Moreover, the course of the case rules out either possibility.

It is difficult to see how the wound could have played any part in causing the later symptoms, in spite of the fact that only the wounded leg was affected. The condition of the hands and leg, I think, was due to the constriction and exposure to cold. The constriction to the hands being more severe, the hands were rendered comparatively bloodless, and vasoconstriction finally occurred; while in the ankle, it not being constricted to the same amount, the outflow of blood was more affected than the inflow, and stagnation, followed by increased permeability, supervened and led to the edema.

As to the long duration, the fact that suggestion has practically cured the condition of the hands and ameliorated that of the foot, points to psychogenic causes having maintained the condition.

In spite, then, of the observations on a number of cases of erythromelalgia and causalgia in which organic changes have been demonstrated, it seems wrong to assume such changes in every case. Where organic changes do occur, they may at times be secondary to disturbances of function, and not causes of the disturbances of function. Once established, a vicious circle will be formed; but in their establishment it seems likely that psychogenic factors play an important part.

Cassirer has collected 130 cases of erythromelalgia, some of which were associated with diverse organic conditions—tabes, tumours, multiple sclerosis, arteriosclerosis, etc.—and which were relieved by the treatment of the underlying conditions (e.g., syphilis). In many of his cases the symptoms persisted where there was no evidence of any organic factors. In such cases psychotherapy should be considered. That the sympathetic nervous system was involved is obvious if only from the marked improvement that has followed the administration of thyroid. This does not detract from the importance of psychogenic factors. "The emotions find their expression through the sympathetic nervous system" (Langdon Brown).

Finally, it is interesting to note that, in certain cases of causalgia, the Committee upon Injuries of the Nervous System, in their report to the Medical Research Council, recommend psychotherapeutic treatment. That recommendation is fully supported by the observations in this paper.

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Critical Review.

SUGGESTION, AUTOSUGGESTION, AND MENTAL ANALYSIS.

By WILLIAM BROWN, OXFORD.

At the present day there are two well-defined lines of thought, with corresponding modes of practice, to be detected within the domain of psychopathology and psychotherapy: these are suggestion and autosuggestion on the one hand, and mental analysis on the other. It is somewhat unfortunate that those who follow these two lines show a tendency to exclusiveness and to antagonism. There is urgent need of a process of synthesis whereby their claims may be harmonized with one another.

According to the general theories of mental analysis the symptoms of psychoneurosis are due to mental conflict and repression, the symptoms being 'compromise formations', satisfying, as well as may be, both the repressed tendencies and also the main personality which has endeavoured to disown them. And a cure, in general terms, is by the method of 'free association' and by other methods devised to evade or to overcome resistance between the repressing and the repressed material, between the ordinary conscious mind and the repressed mind, to allow the repressed material to come up again, and then to encourage the process of 'sublimation' whereby these tendencies are diverted along other paths and towards other objects. There is also the factor of 'transference' which occurs in the course of analysis; but this we will consider again later.

The other line of thought—that of suggestion—is of more ancient origin, and is probably best summed up at the present day in Charles Baudouin's recent book, *Suggestion and Autosuggestion*.¹ In this book Baudouin defines suggestion as the subconscious realization of an idea. This definition involves the assumption of a subconscious mind, the possibility of acceptance of an idea by that subconscious, and the realization of the idea by subconscious mental activity, a certain latent period elapsing between the acceptance and the realization of the suggestion. In accordance with this technical definition of suggestion, one may explain the causation of certain forms of mental illness in terms of bad autosuggestion, and one may

explain their cure as the result of the working of good counter-suggestion, either heterosuggestion or autosuggestion, or both.

One may harmonize these two lines of thought in the following way. As a result of mental conflict the mind is weakened; there is a weakening of mental synthesis, with the resultant tendency to be more readily overwhelmed by emotion and more readily carried away by certain ideas if supported by certain feelings. In this way our subconscious is more ready to accept fortuitous bad suggestion coming down from consciousness. Thus, in etiology one has both general factors at work: mental conflict and bad autosuggestion. Similarly, as regards cure, one may by analysis help a patient to see the relationship between the systems of ideas which have been in conflict, and to make up his mind as to what line he should take to overcome the physiological and psycho-physiological effects of repression. One may also apply counter-suggestion to overcome bad habits of mind and body arising through bad autosuggestion at the time of the original mental conflicts. This suggestion may be given in two ways. It may come in an informal way in the course of the mental analysis itself: this is the unconscious suggestion which springs from the emotional relation of patient to physician which Freud calls transference. But suggestion treatment may be given in a more formal way. This is most conveniently done by asking the patient to lie on a couch with muscles relaxed, in the posture in which he usually sleeps, and to think of sleep in a passive way. His aim should be to avoid voluntary attention to the idea of sleep, and yet to get concentration upon it. His mental state is that of attention minus effort, a state to which Baudouin gives the name *contention*. In this state there is an outcrop of the subconscious, and suggestions can be accepted by the subconscious. The absence of all feeling of effort is a most important condition for the success of the treatment. It has been realized by most people who have specialized in the use of suggestion in recent years; but M. Coné, to whom Baudouin dedicates his book, has emphasized it in the form of his so-called 'law of reversed effort'. Coné sums up this law of reversed effort in the following words: "When the will and the imagination are in conflict, the imagination always wins".² He is here using the terms 'will' and 'imagination' in no clearly defined sense; but, put roughly, he pictures a struggle between the active, conscious striving of the will on the one hand, and imagination in the shape of a suggestion on the other hand, which suggestion, having been accepted by the subconscious, tends to realize itself through subconscious mental activity. He had observed that over-anxiety counteracts the effects of suggestion. Thus, in seeking sleep, if one is over-anxious to go to sleep one becomes wider and wider awake; or, again, in the case of

momentary lapse of memory, with greater and greater effort of will to recover the memory one seems to drive it farther and farther away : but if one changes one's attitude to a state of waiting, the lost memory will often come up. By avoiding effort one has created the condition under which the subconscious can work and give results.

It is doubtful if this formulation of Coué's is a thoroughly satisfactory statement of the mental situation. The facts of the case are real, and have long been recognized : it is the point of view that Coué emphasizes in his law that I would criticize. Let us consider how the will and imagination do come into conflict with one another. Supposing you are anxious to remember a name, you make an effort of will and find the name disappears. Then you adopt the attitude of autosuggestion and the name comes up once more. Perhaps you want to introduce the person to another friend of yours, and you want to avoid appearing foolish, but the name will not come. You make an effort of will to secure it, *but your effort of will is a special kind of will, a rather weak, fitful form of will, because it carries with it fear of failure.* Just as a weak swimmer, suddenly seized with fear, strikes out irregularly and rapidly and sinks, so your will under the influence of fear becomes a spasmodic, useless will that must be abandoned before the lost memory will float up. The fear of failure is a very prominent part of your total mental state. Inability to remember the name arouses fear of a continued inability to recover it. This added emotion wins the day, and your spasmodic will is vanquished. Really, however, the conflict is not between your will and the suggestion, but between one suggestion and another : the suggestion or idea that the name will come to you, and the suggested opposite. By willing in that spasmodic way you have produced the counter-suggestion. This is reinforced by the emotion of fear, and makes your will the kind of will that is inferior to suggestion. The complete form of will is never in conflict with suggestion. This will works, not through an effort of determination, but with a calm assumption that, of course, it is going to succeed. This kind of will is not inferior to suggestion. In dealing with patients we find that if the law of reversed effort is explained to mean that entire passivity will secure a certain result, there is often improvement at first, but the patients are mystified, and find that eventually they have to use their wills in one form or another. It becomes necessary to explain that spasmodic, impulsive will is not an expression of the full personality : that what they should cultivate is a will based upon a quiet, calm, firm belief in the reality of health and the innate tendency of body and mind towards health. Such a form of will is not in opposition in any way to suggestion for their good : in fact, their individual suggestions are merely aspects or parts of that will. Hence

I cannot help feeling some doubt about this formulation of the law of reversed effort. You must avoid strain in carrying out heterosuggestion or autosuggestion, but it is a dangerous doctrine to say that you must avoid will. Obviously you must avoid spasmodic will, but you need the steady determination to retain a real belief in the power within that works towards full health of body and mind. You must will to be well, your efforts of will being of the nature of a studied resolution coupled with a set calm faith that we are in harmony with, and not unimportant parts of, a much wider spiritual system.³

In his practical technique, M. Coué employs certain preliminary tests of automatism, e.g., the production of inability in the patient to clasp his two hands, which are definite dissociations characteristic of the hypnotic state. In this respect, too, he is open to criticism. Equally beneficial results can be obtained by suggestion and autosuggestion without any employment of such artificial dissociations. In other words, suggestion may be practised to the complete exclusion of hypnotic suggestion.⁴

In his *Hypnotism and Treatment by Suggestion*,⁵ Dr. A. E. Davis has produced a concise and very readable elementary account of the theory and practice of suggestion, with numerous examples of recoveries produced by this form of treatment. He also has a short chapter on psycho-analysis, and two fresh chapters on "Mental Accidents" and "Fear" are additions in the third edition. He makes it clear that analysis is needed, in conjunction with suggestion, for the treatment of mental disorders, and although he has little to say that is new on the theoretical side, he can be followed as a thoroughly reliable guide by those who come new to the subject.

The problem of the relation of the subconscious or unconscious mind to the vegetative and other functions of the body is badly in need of stringently scientific investigation. It should be noted that neither Coué nor Baudouin is a medical man, and that the views they hold as to the great power that suggestion has in producing improvement in, or cure of, purely physical ailments need thorough confirmation from medical men of wide clinical experience before they can be accepted by the medical profession.

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Editorial.

DIFFICULTIES OF PSYCHOLOGY.

AMONG those who connect themselves with the practice of psychological treatment we notice egotists, weathercocks, weak visionaries, and vagabonds. Egotists practise not so much psychology as the insistence upon their own views. Weathercocks practise psychology when the wind blows favourably, but a transient newspaper article is sufficient to make them veer in a new direction. Weak visionaries practise psychology in the sense that they will not practise anything ordinary. Vagabonds take it up as they take up anything that has not strongly-defined barriers, and use it as a kind of conjuring trick, for they only feel themselves alive when they are playing ingenious rôles. These people are not interested in psychology. They are interested in certain forms of imagination by which they are dominated. These sorts of people are attracted most easily to the uncertain and fluctuating growing-point of human investigation. Their presence constitutes one difficulty that psychological treatment encounters.

But another difficulty lies amidst those people who are interested in psychology itself, for there are determinists and voluntarists, intellectualists and emotionalists, pragmatists and metaphysicians, and many others, and they speak with different voices and with equal sincerity. So there is no unity. This difficulty belongs to life itself. Life produces many different types, which are in essential disagreement concerning the way life is to be looked at. Moreover, it is just when unity is most aimed at and needed by men that the danger of falling into diversity seems to be greatest. The myth of the Tower of Babel is not easily put out of the mind in these days. Why should we be dominated by this idea of unity? Can unity ever be?

These are ordinary difficulties. But there is another, and this perhaps is one of the main difficulties with which psychological medicine has to contend in this phase of its development. The public has not yet attained to a conscious conception of practical psychology, for which nevertheless it experiences an unconscious need. At the same time, it is possible to say that psychology has

not yet found proper room among the scientific conceptions on the nature of things that still hold sway. In science in general, as in Europe in general, certain conceptions still prevail, and although some discoveries have already been made which contradict these conceptions, the scientific game is still played rather stiffly with regulation moves. Better stiffly than loosely; yet it is certain that the trend of scientific investigation has been increasingly from grosser to finer matter. Psychology is probably a question of the study of finer matters—finer, that is, than those which compose vitamins. The tremendous power for health or disease that is possessed by vitamins is already understood by a few people. Take this idea one step further, and the tremendous power that may be possessed by still finer matter—mental attitudes and emotional attitudes—upon the state of health becomes capable of realization. The key may be in matter of the finest sort, that can be influenced only by the finest psychological touch—by the finest knowledge and feeling. But the important thing at the present stage is that a simple conception of psychology should be conveyed to people in general. For they are still in that state in which they either believe, or do not believe, in psychology: as once they were in the state of either believing or not believing in chemistry, physics, astronomy, physiology or biology—or any science. The majority of people are indeed probably hostile to the conception of psychology. This is partly based on a certain form of superstition that enslaves man. When Simpson discovered chloroform, the attitude was taken up that chloroform was immoral, because it spared people from suffering in operations and childbirth. God wished people to suffer. Simpson discovered chloroform. God's purpose was defeated. Therefore Simpson was immoral. Simpson replied that the use of anaesthetics was supported by Biblical narrative. God had thrown Adam into a deep sleep when he made woman. This form of superstitious hostility certainly exists as a factor in opposing the birth of a general conception of psychology.

But a yet greater factor is the general ignorance or misinterpretation of what psychology aims at. This is partly due to the rather narrow view that certain psychological theories have taken concerning the meaning of practical psychology. What does a hostility to psychology mean? It means a hostility to the idea that the nature of man's life depends largely on unrealized attitudes he takes towards it: that 'mind-forged manacles', as Blake called them, are the commonest sources of misery, and that by looking inside himself for the cause of many difficulties that he only sees outside himself he will discover a new world of possibilities and a new explanation of his life. When Butler drew his picture of the city in

which everyone who had physical disease, even a cold, was tried by jury and sentenced to imprisonment, while those who had psychological trouble were treated in the same spirit as we treat physical illness, he reversed existing values. By so doing he made the conception of psychology a living thing. What is accepted as inevitable by us, or punished by law, was to those people just what they sought treatment for. But with us a bad-tempered man may upset the life of the office he works in, and upset his own life, and everyone accepts it. But if the same man has an attack of jaundice everyone expects him to have medical treatment. The idea that bad temper may have its own etiology and treatment does not yet reach people. They would certainly think it foolish not to have jaundice treated, but the ordinary psychological disturbances of humanity are accepted as inevitable. The conception behind psychology is not yet manifest to most people.

Abstracts.

Neurology.

ETIOLOGY.

- [1] Juvenile tabes, with especial reference to hereditary and constitutional factors (Die juvenile Tabes unter besonderer Berücksichtigung der hereditären und konstitutionellen Momente).—BAUMGART. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1921, lxxi, 321.

THE author has analyzed no less than 130 cases of juvenile tabes or tabo-paralysis, personal and from the literature, so that the documentary value of the paper is considerable. Of these 130 cases, 19 were in patients whose parents (one or both) had suffered from metahætic nervous disease. Since, however, in 37 no information as to the parents was forthcoming, the proportion is in reality 19 out of 93. As regards these 49 cases, in 39 the parents (one or both) were tabetics themselves, while 10 (one or both) were general paralytics. The female sex supplied 32 and the male 16 examples of the affection; in one case the sex was not stated; of the whole number of 130 cases, 74 belonged to the female sex. In addition to the marked hereditary element a large proportion of cases of juvenile tabes is characterized by a constitutional inferiority, seen more particularly in the persistence of stigmata of infantilism. To this the author attributes a pathogenic significance, but these characteristics may perhaps partake more of the nature of effect than of cause.

S. A. K. W.

PATHOLOGICAL ANATOMY.

- [2] The pathological histology and pathogenesis of amaurotic idiocy (Contribution à l'étude de l'histologie pathologique et à la pathogénie de l'idiotie amaurotique).—G. MARINESCO. *L'Encéphale*, 1921, xvi, 481.

PROFESSOR MARINESCO gives us in this paper a minute and painstaking study of the nervous system from a case of amaurotic family idiocy which presented all the usual clinical features.

The results obtained by the methods of Nissl and of Bielschowsky and Cajal were in every way similar to what many others have reported, viz., swelling of the cell bodies and dendrites, disappearance of the intracellular fibrils except round the periphery, and so on. Special attention is drawn to the fact that the nuclei of the cells were relatively unaltered. Of greater novelty are his findings obtained by the methods of Perls for

iron. Best for glycogen, Ciaccio and Dietrich for lipoids, Benda and Regaud for the minute protoplasmic granules known as mitochondria (chondriosomes, neurosomes), and the indophenol-blue method for oxydases.

Lipoid granules were found everywhere in the nerve-cells of the cortex, cerebellum, and spinal cord, in varying degree; by contrast, few were seen in the cytoplasm of the neuroglial cells. An intimate connection existed between the severity of the cell lesions and the amount of glycogen deposit therein: glycogen granules were massed in the most diseased cells and occasionally in their nuclei, also in their dendrites, and to a less extent in glial cells and processes. The quantity of oxydases was in inverse proportion to the amount of lipoids: where achromatosis was revealed by Nissl's method there also was poverty or absence of oxydases, but in the immediate vicinity of the nucleus, in the dendrites, and also round the nerve-cells, ferments were present in abundance. Generally speaking, the superficial layers of the cortex were poorer in this respect than the deeper. A similar relation between oxydases and lipoids was found in the Purkinje cells, and in the spinal ganglia and cord. The topography of the reaction for iron corresponds to that of the chromatic substance of Nissl; so that where achromatosis was noted the reaction for iron was negative. As for the mitochondria, a marked diminution in their quantity was noted in all the cells of the cortex, in the cell-bodies, dendrites, and saccular dilatations, and they were more irregularly distributed than in normal preparations. Apparently none were to be seen in glial cells or their prolongations.

The physical and chemical phenomena of the disease are doubtless intimately related. The swelling of the cell-body, etc., is due to increase of intracellular osmotic tension; colloid particles disappear and lipid granules take their place. In comparison with the cytoplasmic changes, the relative conservation of the nucleus is of capital importance. The anatomical basis of the processes of heredity has usually been taken to be the nuclear chromatin, but its intactness in cases of amaurotic family idiocy militates against this conception; in this disease the histological changes are the expression of disturbance of function of intracellular ferments, and it is the cytoplasm which transmits the pathological peculiarities of the affection. Marinesco's conclusion is that the familial element is dependent on the diastasic activity of the mitochondria of the cytoplasm.

S. A. K. W.

- [3] The histological aspect of diffuse cerebral sclerosis (Histologisches zur Frage der diffusen Hirnsklerose).—(NEUBURGER. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1921, lxxiii, 336.

DIFFUSE cerebral sclerosis, so-called, has always been a somewhat unsatisfactory nosological conception. From the histopathological viewpoint it may be regarded as the terminal stage of either inflammatory or degenerative processes in the white matter of the cerebrum; and in cases of diffuse glioma analogous histological changes may be found. In all of these the peculiar localized outfall of myelin sheaths is to be observed which is characteristic of the condition. A special form of inflammation, leading to

diffuse brain sclerosis, is that involving the white matter of the cerebral hemispheres and known as encephalitis periaxialis diffusa (Schilder) or diffuse infiltrative encephalomyelitis (Jacob). It occurs usually in young people, and its clinical manifestations are remarkably variable. Pathologically it is distinguished by the appearance of larger or smaller areas of disease in the subcortical substance, with loss of myelin sheaths and of axis-cylinders: fatty changes: overgrowth of mesodermal tissues and development of thick glial network, sometimes with large glial cells, and secondary degeneration. Macroscopically the diseased areas are commonly yellow-grey in colour and of variable consistency. The etiology of the disease is still obscure, but it presents very close resemblances to disseminated sclerosis.

S. A. K. W.

- [4] **Two cases of bilateral hemiachromatopsia of central origin, with pathological examination** (Zwei Sektionsfälle doppelseitiger zentraler Farbenhemianopsie).—GEORG LENZ. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1921, lxxi, 135.

THE first case was that of a man of 60, who had had a 'stroke' with loss of consciousness. The ocular defect was as follows: In both left upper quadrants, excluding the macular and paramacular areas, loss of vision: in these, as in the whole of the left half fields, complete achromatopsia: in the right fields, complete blindness for colours except in a small sector in the lower quadrants extending from the macular area out to about 30°. In brief, the case was one of bilateral hemianopia.

The second case was that of a man of 62, who also had had a 'stroke' on the left side, and whose ocular condition was the following: Right field—a small central scotoma for white and colours, absolute loss of colour vision in the whole of the rest of the field, except that in a small area below and outside the macular field red and blue 5 cm. objects were occasionally recognized. Left field—no scotoma, occasional recognition of colours in one quarter of the macular field (right lower), extending out only about 4°: in the whole of the rest of the field of the left eye, complete achromatopsia. This case, similarly, was one of bilateral hemianopia.

Pathologically, there was found in the first case an area of softening of the right lower calcarine cortex, beginning some 2 cm. from the occipital pole and extending forward to the anterior fourth of the gyrus: on the left side, a somewhat smaller area of softening was found in the fusiform gyrus, beginning about 1 cm. from the occipital pole and extending to about 2 cm. from the junction of the calcarine with the parieto-occipital fissures. In the second case there were diffuse lesions of the white matter underlying both visual areas. A very painstaking microscopical examination of cells and fibres in both cases was undertaken, and a large number of beautiful photographic illustrations are given in the paper. The details are so numerous that they cannot well be given in abstract, and for them the original should be consulted. Suffice it to indicate here some of the author's conclusions.

The cases support the view that the lower calcarine cortex represents the upper visual fields, i.e. the lower retina, and that the macula is repre-

sented posteriorly towards and in the occipital poles. They furnish strong evidence for the hypothesis that disturbance of colour vision depends on defect of conduction of the white matter of the calcarine region generally, and that the degree of the latter is parallel to the degree of the former. The law of 'vertical projection' holds good for colour as well as for white. Further, the cases suggest that it is the outer cell layers of the visual cortex that are concerned with the appreciation of colour. There is no evidence of the existence of a special tract or path among the optic radiations which stands for the conduction of the impulses underlying the colour sense.

No worker at this difficult subject should neglect to study this important communication.

S. A. K. W.

- [5] **An anatomical and pathological study of three cases of the spinal form of Landry's disease** (*Étude anatomo-pathologique de trois cas de maladie de Landry à forme médullaire*).—P. MARIE and C. TRÉTIAKOFF. *Revue neurol.*, 1921, xxxvii, 777.

UNDER the above title the authors publish full details, both clinical and histological, of the following cases:—

Case 1 was that of a girl, age 16, who died after seventeen days' illness which began suddenly with intense headache, high fever, and ophthalmoplegia. The temperature fell on the third day, and thereafter remained irregular, with a brief ante mortem rise. After the onset she had seemed to be recovering, but at the end of the first week she complained of numbness in the legs and difficulty in micturition. The paresthesiae spread upward to the trunk, and were accompanied by weakness, and on the twelfth day of the disease, when a detailed examination was first made, the arms also were involved. At this time her mental condition was quite clear. She could make no movements except of the upper extremities (which were weak) and the head and neck. The deep reflexes were abolished in the lower limbs, the abdominal reflexes absent, and the plantar responses doubtfully flexor. There was some loss of sensibility up to the nipple line, and burnis caused by hot bottles on the abdomen had not been felt. The bladder was distended, requiring the catheter. The patient complained of intense headache. The cerebrospinal fluid contained .03 albumin and 20 leucocytes per c.mm. The main features of the microscopical examination, which are clearly illustrated in the paper by drawings, may be summarized as follows. The whole cerebrospinal axis was peppered with minute inflammatory foci, which were entirely confined to the white matter and were most intense in the mid-dorsal region. The lesions consisted of perivascular small-celled infiltration, degeneration of the axis cylinders, and increase of glia cells.

Case 2 was that of a woman, age 35, who died after an illness of three weeks' duration which took the form of an ascending flaccid paralysis. Histological examination revealed acute inflammatory changes of the type commonly found in acute anterior poliomyelitis. These were confined to the anterior horn cells in the cord and to the grey matter of the brain stem and basal ganglia. Two small zones of degeneration were apparent in the posterior columns.

Case 3 was that of a girl, age 14, the subject of bony tuberculosis. The illness commenced with paralysis of the lower limbs, which extended upwards so that on the fourth day the condition was one of flaccid quadriplegia with abolition of all reflexes, and in addition paralysis of the palate and loss of sphincter control. Intense vulvovaginitis and bronchopneumonia were also noted during life. The disease terminated fatally in six days. Histological research demonstrated lesions which were necrotic rather than inflammatory, occupying the anterior horns in the spinal cord. These masses of grey matter appeared to be distended in some places by an exudate from which cellular elements were singularly lacking.

In their discussion of these cases, the authors make it clear that their conception of Landry's disease is more generous than that commonly accepted in this country. They would include under this heading every case of ascending paralysis, distinguishing first those cases of this condition which are due to an acute peripheral neuritis, and subdividing the cases in which the spinal cord is affected into poliomyelitis, leucomyelitis (the white matter being chiefly involved), and diffuse ascending myelitis. They point out the striking discrepancies between the histological appearances of the three cases reported, and conclude that it remains for the bacteriologist to establish a more rational classification in this group of diseases.

C. P. SYMONDS.

CLINICAL PATHOLOGY.

[6] Laboratory findings in early and late syphilis: review of one thousand and sixty-four cases.—FORDYCE and ROSEN. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 1696.

This paper aims at correlating the serum and spinal-fluid findings in a large number of cases with the clinical signs and symptoms of the patient. It must never be forgotten that syphilis is a constitutional disease, and signs of neurological and visceral involvement may be discovered if looked for in cases which come up for quite other manifestations of the disease. The authors group as secondary all cases presenting themselves for treatment within two years of the original infection, and as tertiary all others. Of 243 secondary cases 64, and of 821 tertiary cases 480 had abnormal findings in the spinal fluid. These results showed a higher proportion of positives than normal because they included several cases of obvious neurosyphilis specially sent to the clinic. Elaborate statistical analyses of these figures are given. The cases seem to fall into groups:—

1. Mild reactions with no complaints. These yield to treatment, and later give negative results.

2. Strong reactions with indeterminate complaints of headache, giddiness, fatigue, lack of concentration, pains in the limbs, and slight neurological signs such as pupillary changes or inequalities in reflexes. These often resist treatment.

3. Malignant type simulating meningitis and often terminating fatally. These require very small doses of antisyphilitic remedies until the spinal canal has been drained several times to relieve pressure.

4. Frank neurosyphilis, including the classical vascular and meningo-vascular forms, gumma, tabes, taboparesis, and paresis. In the pure vascular type the spinal fluid is usually negative, or a few cells and a small amount of globulin may be present. In the meningovascular form the fluid may be negative, yield cells and globulin only, or be positive in all phases. In tabes the picture varies with the activity and stage of the process. In so-called abortive forms the fluid is negative. In early, active and progressing types it is usually strongly positive, while in the late degenerative types it is frequently negative. In taboparesis the fluid is strongly positive with a paretic curve. In early untreated cases of paresis a positive fluid was found in 100 per cent of the cases, the cell count ranging from 20 to 250, a marked increase in globulin, strongly positive Wassermann reaction with 0.2 c.c. or less, and a paretic curve. In gumma unaccompanied by a meningitis the fluid is usually negative. Psychoses occurring in syphilitics who do not present clinical features of tabes or paresis give a negative fluid.

The authors' statistics show that the incidence of nervous-system involvement is much higher in men than it is in women.

The statement is frequently made that neurosyphilis has increased since the use of the modern antisiphilitic remedies. This increase, in their opinion, is more apparent than real, and is to be attributed to the more systematic investigation of patients and our more thorough knowledge of the disease. There is no proof that arsenamin adversely affects the optic, auditory, or other cranial nerves; on the contrary, definite data are furnished showing arrest of optic atrophy by the proper use of the drug. Pupillary anomalies and cranial-nerve paralyses are often pathognomonic and are always suggestive of nervous syphilis. In papillitis and optic neuritis occurring in early syphilis, vision may be normal, with only slight narrowing of the fields. The necessity for routine ophthalmologic examination must, therefore, be emphasized, so that the earliest changes may be detected before irreparable damage is done to the eye. The absence of clinical signs and symptoms does not exclude syphilis of the central nervous system. The classical signs and symptoms of tabes may occur with a negative blood and spinal fluid. Likewise, neurosyphilis of the vascular, gummatous, and other types may present subjective and objective clinical symptoms with an excess of globulin only in the fluid.

The colloidal-gold reaction has been employed by the authors for six years. They consider it of great diagnostic and prognostic value. A luetic curve enables them with almost absolute certainty to exclude paresis. A paretic curve is always present in paresis in untreated cases, but may be encountered in meningovascular syphilis and may disappear under treatment. A paretic curve is also found in some types of early neurosyphilis, and disappears as the other phases become negative.

R. G. GORDON.

[7] Neurosyphilis with negative spinal fluid.—SOLOMON and KLAUDER, *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 1701.

THE authors point out that neurosyphilis may exist without positive

findings in the cerebrospinal fluid. In addition to purely vascular syphilis, which only gives positive findings in the fluid if there is marked inflammatory reaction round the vessels, negative findings may occur in tabes, cerebral gumma, syphilitic cerebral nerve palsies, Erb's spastic paralysis, paraplegia, epilepsy, paranoia, and dementia. They regard the Argyll Robertson pupil as being pathognomonic of syphilis, and consider that the experienced neurologist may diagnose neurosyphilis from various characteristic combinations of symptoms in the absence of laboratory findings. The general opinion is that positive findings in the fluid exist for many years before symptoms are manifested, but exceptions may occur, and some believe that syphilis confined to the brain always gives negative fluid findings. It has been shown that the gold reaction varies in the same patient according as the fluid is taken from the ventricle, the cisterna magna, or the lumbar sac.

Cases of tabes with negative findings include (1) cases of incipient progressive type, (2) cases in which pathological findings have disappeared after treatment, (3) abortive tabes. Case notes are given of all types of neurosyphilis with negative fluid findings.

R. G. GORDON.

SYMPTOMATOLOGY.

- [8] Two cases of cerebrospinal cysticercus infection with chronic meningitis and endarteritis of the brain (Deux cas de cysticercose cérébro-spinale avec méningite chronique et endartérite oblitérante cérébrale).—L. REDAIE. *Revue neur.*, 1921, xxxvii, 211.

THE two cases may be summarized as follows. The first was that of a woman, age 54, with a nine months' history of headaches and pains in the back, and occasional attacks of vertigo without loss of consciousness. Some weeks before death there developed retention of urine, constipation, paralysis of the limbs, paresis and dilatation of the left pupil, disturbances of sensibility, exaggeration of the deep reflexes, and extensor plantar responses. The intellect failed, there was swelling of the optic discs and a positive Kernig's sign, and finally the patient died with bed-sores and cystitis. Lumbar puncture some weeks before death showed an increase of albumin, 210 cells per c.mm., and a positive Wassermann reaction.

At the autopsy there appeared to be a considerable degree of internal hydrocephalus and a chronic leptomeningitis affecting mainly the base of the brain and the cervical region of the cord. Histological examination showed structures resembling the cysts of cysticercus in the meninges of the ventral surfaces of the pons and of the cervical cord, and an obliterative endarteritis of the large and medium-sized vessels at the base of the brain.

The second case was that of a man, age 66, who had suffered for fifteen years from epilepsy and for some months had noticed difficulty in walking. He was admitted to hospital with a diagnosis of multiple cerebral thrombosis. The Wassermann was negative in the blood, positive in the spinal fluid; the latter contained at that time 32 cells per c.mm.

He was treated with salvarsan and mercury, and two months later the Wassermann reaction was negative in the spinal fluid, which, however, still contained 33 cells per c.m.m. Clinically, the patient made no improvement, and died somewhat suddenly a few months afterwards with signs of medullary failure.

In this case at the autopsy several cysts of different sizes were apparent upon the surface of the brain protruding from the subarachnoid into the subdural space. The largest of these measured nearly 5 cm. in diameter. They were most numerous at the base and in the lips of the Sylvian fissures. In addition there were chronic basal meningitis and endarteritis of the basal vessels. These latter changes were especially well marked in the basilar artery, the intima being enormously thickened, the internal elastic lamina broken, the media degenerated, and the adventitia converted into a mass of granulation tissue. On section of the brain, cysts were found in the cortex of both frontal lobes, and a single specimen the size of a haricot bean was discovered in the third ventricle. The spinal meninges were not seriously affected, but a cyst 1 cm. in diameter was visible on the lateral surface of the cord in the dorsal region.

In his discussion of these cases the author devotes much space to a detailed account of the histological appearances, especially those in the vessels. These, together with the diffuse thickening of the leptomeninges gave rise to a picture resembling that produced by syphilis, and this was all the more striking in view of the positive Wassermann reaction in the spinal fluid in both cases. Commenting upon the latter finding, the author takes it to mean that there was in both cases a coincidence of the two infections, spirochaete and cysticercus; but he quotes other cases from his own observations to show that the Wassermann may be positive in the spinal fluid in the absence of clinical evidence of syphilis.

It is noted that in neither case was the adult form of cysticercus found in the intestine: the ova therefore must have been ingested as such or have outstayed the parents in the host.

There are many references to the literature, and the paper should be consulted in the original by all who are interested in the subject.

C. P. SYMONDS.

[9] Epidemic encephalitis simulating myasthenia gravis. — M. GROSSMAN. *Jour. Nerv. and Ment. Dis.*, 1922, lv, 33.

THE cases of three patients are presented, one of whom was improving, one was dead, and one was *in statu quo*. These cases presented clinical pictures simulating myasthenia gravis so closely that the positive diagnosis was not definitely made for some time. The apparently acute onset of the illness, the age of the patients in *Cases 1* and *2* at the time of onset: the lack of variations in the degree of the muscular weakness: the absence of the true myasthenic fatigue phenomenon, and of the myasthenic electrical reaction: the persistent hyperactive inexhaustible deep reflexes: and the complete persistent external ophthalmoplegia, pointed against the diagnosis of myasthenia gravis. The persistent eye-muscle palsies, the unequal pupils in *Case 2*, the increase in the deep reflexes in all three patients, the bladder

disturbance in *Case 2*, the tendency to the Babinski phenomenon in the first two patients, the atrophy of the muscles in all three patients, the acute course of the disease in *Case 2*, and the lack of remissions formed the basis for the diagnosis of acute epidemic encephalitis. The pathological findings in *Case 2* confirmed the diagnosis in one case in a group of three patients who presented remarkably similar clinical pictures.

R. G. GORDON.

- [10] Experience with more than one hundred cases of epidemic encephalitis in children.—J. B. NEAL. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 121.

THE course and symptomatology of these cases is dealt with fully; but the most interesting part of the paper deals with sequelæ, which are thus compared with sequelæ in adults:—

Weakness or paralysis: Adults, 8; children, 4.
 Tremor, choreiform movements, spasm: Adults, 6; children, 3.
 Pains in body or limbs: Adults, 2.
 Headache: Adults, 8.
 Dizziness: Adults, 3.
 Nervousness: Adults, 5; children, 6.
 Change in disposition: Adults, 1; children, 3.
 Insomnia: Adults, 3; children, 2.
 Drowsiness: Adults, 1; children, 3.
 Speech defects: Adults, 6; children, 3.
 Defects of eyes: Adults, 9; children, 4.
 Change in mentality: Adults, 14; children, 10.

The changes in mentality are of great interest. In children there are usually indications of mental deterioration—the child is ‘demoted’ in school when previously it had made good progress. In adults there is less of memory and of ability to concentrate, in the milder cases, and sometimes mental depression. In one instance a young woman committed suicide during convalescence. One man was at a hospital for the insane for some months, but was finally paroled. A woman had been at such an institution for over a year.

It is interesting to compare these frequent, diverse, and serious sequelæ with those of poliomyelitis and epidemic meningitis. In the former, the sequelæ are certainly sufficiently grave, but they are confined almost entirely to flaccid paralyses. In meningitis only a very small percentage of sequelæ occurs. The most serious is deafness, and this occurs in only 3 or 4 per cent of cases. Blindness, due practically always to a panophthalmitis, is still more rare. While a popular opinion exists that mental defects are often due to meningitis, a careful study of recovery cases of meningitis fails to corroborate this opinion.

Relapses after comparatively short periods of improvement occasionally occur. In one instance, already referred to, there was a second attack, at the expiration of a year of good health, which proved fatal.

R. G. GORDON.

- [11] **Contributions on the clinico-anatomy of cerebral tumours** (Beiträge zur Klinik und Anatomie der Hirntumoren).—WEXBERG, *Zeits. f. d. g. Neurol. u. Psychiat.*, 1921, lxxi, 76.

THIS somewhat discursive but informative paper is based on the study of some 36 cases of cerebral tumour personally observed. Among the matters of neurological interest are the following.

1. In several cases the presence of nystagmus could not be set down either to local or neighbourhood lesions, and is ascribed by the author to the rise of intracranial pressure producing a 'labyrinthœdema' analogous to papilloedema (Stauungs labyrinth, Stauungspapille). The vertigo of many cases of intracranial tumour, similarly, is not of localizing significance, or but rarely so.

2. In four cases disturbance of bladder function was observed (retention, precipitate micturition), in two and perhaps three of which the lesion was presumably bilateral; but they do not lend definite support to the view which ascribes sympathetic control to 'centres' in the basal ganglia (Czyhlarz-Marburg and others).

3. In 20 out of 28 cases, examination by *x* rays revealed recognizable changes: (a) Calcification foci within the brain; (b) Alterations in the sella turcica; (c) Changes in the skull produced by rise of pressure; (d) Local changes in the cranial bones. It appears, however, that none of these is of much localizing usefulness; thus in no less than 13 cases the sella turcica and its vicinity were altered, yet the author specifically states that in none was the lesion local.

4. One very interesting case of frontal tumour is given in detail, since the patient showed in characteristic form not only motor apraxia but the phenomenon of tonic innervation. At the operation a tumour the size of 'a man's fist' was found occupying the first and second left frontal gyri. The symptom of tonic innervation (also called, less accurately, tonic perseveration) is discussed at some length, and ascribed to a lesion of frontocerebellar paths; but there is no reference to the striking case of Goldstein in this connection, or to the contribution on this subject made by Wilson and Walshe.

S. A. K. W.

- [12] **The existence of gastric ulcer with tabes dorsalis.**—B. B. CROWN, *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 2023.

THE author points out that once a diagnosis of tabes with gastric crises is made, all thought of ulcer is usually dismissed, but he describes three cases. The first was one of violent tabetic crises with symptoms very suggestive of gastric ulcer, but one in which the existence of the latter complication could not be established. The second was a case of tabes with predominant gastric symptoms and an apparent duodenal ulcer. The third was an example of advanced tabes with vomiting, hæmatemesis, and melaena due to an active bleeding duodenal ulcer.

The frequency with which ulcer co-exists with tabes cannot be stated; that it can so co-exist is certain. The pathogenesis of the ulcer as a complication of, or coincident of, tabes is probably as follows: cerebro-

spinal syphilis is accompanied in a large percentage of cases by gastric hypersecretion. Organic lesions of the spinal cord or brain often cause delayed gastric motility, and probably abnormal gastric peristalsis. These two conditions presumably predispose to gastric or duodenal ulcer. Syphilitic arteritis may also play a rôle. Such ulcers as form are probably simple peptic and not syphilitic ulcers or syphilis of the stomach. The point of origin of the secretory and motor disturbances in the stomach and intestine is probably in the involvement in the pathologic process of the sympathetic fibres to these viscera in their passage through the dorsal spinal ganglions and posterior nerve roots. It is quite possible that the finding of a gastric or duodenal ulcer in tabes is a pure coincidence, and that there is no relationship of cause and effect between the two conditions.

R. G. GORDON.

TREATMENT.

[13] **The treatment of brain tumours.**—W. E. DANDY. *Jour. Amer. Med. Assoc.*, 1921, LXXVII, 1852.

IN this somewhat dogmatic paper the author castigates modern brain surgery, and concludes that: (1) Brain tumours are among the most frequent neoplastic lesions; their growth is always progressive, and almost always leads to a train of terrible sequelæ and eventually to death. (2) There is only one form of treatment for tumours of the brain—operative removal—and this must be complete. (3) To obtain the best operative results, brain tumours must be diagnosed and localized in the earliest stages. (4) It is now possible to diagnose and localize practically every tumour, and in the early stages. When all other signs and symptoms fail in the localization, cerebral pneumography will make the diagnosis and localization with precision and without equivocation. And when a tumour is not present, it can be excluded by the same method. (By cerebral pneumography the author means x-ray photography after inflating the ventricles or spinal canal, or both, with air. This procedure, he points out, is only safe or justifiable when performed by skilled operators; but he claims that by alterations in the spaces so demonstrated the presence and localization of a tumour can almost infallibly be demonstrated.) (5) The operative approach will be dictated by the precise localization. The approach should afford adequate room, and it should be directly over the tumour. (6) After correct localization, all brain tumours should be disclosed at operation. (7) Every effort should be made to cure the patient by complete extirpation of the growth. There is less mortality from carefully performed tumour extirpations than from unsuccessful explorations for tumours. When, for any reason, it is impossible or unjustifiable to remove the tumour, the maximum palliative relief should be given at the same operation. (8) Decompressions, 'routinely' performed, are among the most harmful and indefensible operations in surgery. They should never be performed for unlocalizable tumours. They are the exact equivalent of giving morphine for abdominal pain; the symptoms are masked until it is too late. (9) Decompressions should be performed only as a last resort—when the tumour cannot be removed—and then only after the location of the tumour

is known, for in half the cases of brain tumour no good can possibly be derived from a decompression. (10) Exploratory craniotomies for brain tumours are now scarcely ever indicated. The tumour should be precisely localized before any operative procedure is attempted. (11) Scientific accuracy must supplant guess-work in diagnosis and in directing the treatment. Early and accurate localization and thorough operative treatment will eliminate all unnecessary and harmful operations. The treatment of brain tumours can only be a direct eradication of the cause—prompt and efficient.

R. G. GORDON.

[14] The third year in infantile paralysis.—R. W. LOVETT. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 1941.

THE author analyzes a series of cases both with regard to progress during the first three years and the condition at the end of the third year. He concludes that infantile paralysis affecting the upper extremity is milder and more amenable to improvement and cure than that affecting the lower extremity. Muscles in the upper extremity, under the treatment described, improve continuously for four years, the improvement being most rapid in the first year. In the lower extremity, improvement is also most rapid in the first year; but after the third year there is a tendency toward a slight loss of muscular power, especially marked in the lower leg, under the best conditions of intensive treatment that can be afforded in a public clinic where its object is the prevention of deformity and the avoidance of fatigue, and where muscular re-education is pursued throughout. The chief cause of this loss is deformity occurring in the lower leg.

The following causes tend to make the chance of recovery in the lower leg less favourable than elsewhere in the body, except in the abdominal muscles: (1) A tendency of the paralysis to be more severe from the start; (2) The frequent occurrence of deformity; and (3) The fact that in weight-bearing the greatest amount of strain is thrown on the muscles of the lower leg. The outlook in the tibials is particularly poor, and the more favourable condition in the peroneals explains the predominance of valgus deformity. Operation may temporarily diminish muscular power, and improved function occurs before the improvement in muscular power shown by a technical examination.

The lessons to be learned are that deformity is to be prevented by every means in our power; that the evidence shows that early weight-bearing is detrimental to weakened muscles; and that the keynote of treatment consists in the preservation of paralyzed muscles and prevention of contraction of their opponents, the avoidance of fatigue in walking, and the preservation of a normal muscular balance between opposing groups as far as possible. With this closer analysis of the potential power of individual muscles to improve, and the general laws formulated with regard to the behaviour of individual muscles, it would seem that operation in a good many cases might be performed with benefit earlier than is now often done, and that it were safe to formulate the statement that deformity, stretching, and fatigue are the three worst enemies of good ultimate function in poliomyelitis.

R. G. GORDON.

- [15] **A method for the administration of sodium chloride for headaches.**—W. HUGHISON. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 1859.

HEADACHE is most commonly due to a rise of intracranial tension even in the case of those accompanying fevers and toxæmias such as those due to intestinal stasis. It has been shown that intracranial tension can be reduced by the administration of hypertonic solutions of salts either intravenously or by the mouth. Owing to its non-toxic properties and absence of purgative effect, sodium chloride has been the salt chosen, but difficulty has been found in giving large doses owing to the intolerance of the stomach. The author suggests giving 1-grm. tablets coated with salol, which pass unchanged through the stomach, the salt being liberated by the alkaline intestinal juices. Of these any number may be given up to thirty without toxic effect, except in cases of chronic nephritis, hypertension, and conditions of known salt intolerance. As a rule two or three are taken every five minutes up to eight or ten. The author claims therapeutic success by the method, and regards it as less harmful than treatment by the coal-tar products. He also suggests it may be valuable as a means of diagnosing between headaches due to hypertension and those due to other causes.

R. G. GORDON.

- [16] **Regeneration in the nervous system (La régénération du système nerveux).**—CH. A. PERRET. *Arch. Suisses Neurol. et Psychiat.*, 1921, ix, 163.

THIS is a lecture, delivered before the Swiss Neurological Society, dealing with the results of surgical operations on the nervous system. The lecturer first reviews shortly the after-results of the surgical treatment of cerebral tumours, intracranial hæmorrhage, and war wounds of the brain, and quotes statistics of the percentage of recoveries in such cases. He then deals rather more fully with the treatment of injuries of the cord, and cites among others a case published by Stewart and Charte where, after suture of a completely divided cord, the patient regained sensibility, motor power, and sphincter control, and her deep and superficial reflexes returned. Unfortunately no reference is made to this case in the bibliography, which is otherwise very full.

Cases of section of dorsal nerve roots, of the auditory nerve, of the chorda tympani, and of the sensory part of the trigeminal, are described, as well as of suture of the facial within the temporal bone, and cross-anastomosis of the facial with adjacent motor nerves.

The greater part of the paper treats of the surgery of the peripheral nerves, and the continental literature on this subject is dealt with in a fairly exhaustive manner. As regards the rate at which the motor nerves regenerate, it is interesting to note that the authorities quoted seem to have found that the interval between suture of the nerve and return of voluntary power in the muscles which it supplies is more than twice as long for the sciatic as for the musculospiral (radial). According to Stracker, the time required for restoration of motor function varies with the distance of the injury from the spinal cord, which is much greater in

the lower than in the upper limbs. English surgeons, however, have found no such difference, and in some cases (Sargent, Stopford) voluntary contraction of the gastrocnemius returned four or five months after suture of the sciatic nerve at or above the middle of the thigh.

This is one among many controversial statements made by Perret, whose experience of war surgery was naturally not great enough to enable him to criticize the statements of French and German surgeons. The paper is, in fact, chiefly a review of the work of others, and as such is of considerable interest.

J. C. GREENFIELD.

Psychopathology.

PSYCHOLOGY.

- [17] **Primitive man and environment.**—G. ROHEIM. *Internat. Jour. of Psycho-analysis*, 1921, ii, 157.

IN this paper the way in which the interaction of primitive man and his environment are reflected in the psychic life of the individual and society is discussed.

Totemism is defined as the belief in the existence of a specific magico-religious connection between a human group and a natural species. It seems probable that primitive beliefs are the expression in the language of unconscious symbolism of the unity which connects human life with nature. Primeval man projects the endopsychical knowledge of the existence of a biological connection between man and his environment into the belief in a magical bond between a clan and a natural species.

Reasons are given which make it probable that primitive man regarded the world surrounding him as a second womb, and that his unconscious apperception of space is based on the experiences of antenatal life. The totem clan does not connect the child which belongs to it with the womb from which he was born, nor with the man who gave him life, but with a given locality.

An ambivalent attitude toward the place of birth and also in relation to the grave is noted. The inhibition of the primary desire for the undisturbed bliss of the maternal womb compels man to lead a roaming life: the return of the repressed elements, although the wish-fulfilment has been transferred from the original object to a symbolic substitute (Mother Earth instead of the real mother), changes man from the wanderer to the sedentary husbandman. It seems as if the primeval cave-dweller must have been led by a blind impulse to seek for a place in which he could live again his prenatal life. In the lowest tribes the death-place is avoided for many years: in the higher tribes the desire to remain in contact with the grave incites them to resist the inroads of strangers into their territory.

The origin of certain concepts of space belongs to the common heritage of mankind. Many examples are given which show that what is higher is regarded as stronger and nobler. The heavens in every religion are supposed to be the home of the gods. The phantastic presentations of a mediæval hell are in reality repressed sexual wish-fulfilments, and hell itself is but one of the lower cavities of the body (vaginal or anal).

C. W. FORSYTH.

- [18] **Sex and hunger.**—ISADOR H. CORIAT. *Psycho-analytic Rev.*, 1921, viii, 375.

ATTENTION is drawn to the theory of the identity of hunger and sexual libido, and that in mental regression the nutritional libido may serve sexual ends, or the sexual libido may appear as purely nutritional strivings. A brief account is given of a case where the hunger feeling was a sort of compulsive symbolic expression of an unsatisfied sexual craving. Cannon's theory of hunger will not alone account for psychic hunger, which may be a sort of regression to the asexualized libido of early life. Stekel has pointed out an analogy between love and hunger. Dreams of eating as symbolic sexual expressions of the unconscious are frequent in the neuroses, and Coriat believes that they symbolically represent a means of utilization of another erotogenic zone, one that is not repulsive to social conventions, as a means of harmlessly securing sexual gratification. The myth of the Garden of Eden is nothing but the unconscious expression of a composite phantasy of childhood, and in its symbolic projection there is a strong linking of eating and nakedness and a feeling of sexual shame. As Freud states, "since bed and board constitute marriage, the former is often put for the latter in the dream, and as far as practicable this sexual presentation-complex is transposed to the eating-complex." The dream of eating together is often a symbol of sexual intercourse, and in certain savage tribes, food, marriage, and ideas of conception are intimately related. In the snake dance of the Hopi Indians we see an example of primitive symbolic thinking of the identification of food and sexual fertility. Sexual symbolisms hidden under the guise of food are quite common in modern society, and the frequent impulse of neurotics to gag or vomit is merely a reaction of disgust towards sexual relations transferred to the food-erotogenic zone. The essential feature of the neuroses with strong somatic symptoms of hunger is the damming up of the sexual libido, and there often occurs the so-called 'air-hunger', the difficulty of breathing in the anxiety states, or the globus, as a displacement of actually repressed erotic sensations.

C. STANFORD READ.

- [19] **Belief and mental adjustment.**—M. A. HARRINGTON. *Jour. Nerv. and Ment. Dis.*, liv, 193.

A COMMONPLACE observation in psychiatry is the presence of extraordinary beliefs with regard to one or two subjects on the part of a patient whose judgement and mental vigour are otherwise excellent. This cannot conceivably be due to gross disease of the brain, and to explain it we must consider the reasoning processes of the so-called normal. Many such have

absurd beliefs, but these are not regarded as unusual by the public, because the causes of these beliefs are obviously the result of some passion or desire. The author describes a case at length, and shows that the delusions of this patient are really founded on passions and desires just as are the 'normal' false beliefs. This patient was seclusive and shy, principally as a result of the circumstances of his childhood, and also because he was somewhat deaf. This seclusiveness was not the result of his own wish: indeed the patient strongly resented it, and developed two strong desires, namely, the desire for companionship and the desire for revenge on those who seemed to rebuff and insult him. He therefore developed a belief in 'a spirit doctor' who looked after him, defended him from the unsympathetic world, and punished his enemies. Absurdities of belief give rise to absurdities of conduct, and in his desire for recreation he went into trances in which he boxed, fenced, sang, and danced under the benevolent direction of the spirit doctor. These soon led to visual and auditory hallucinations, and visions of various sorts began to appear after he had suffered financial losses. These were compensatory for the deprivations which he underwent as a result of his shyness, and also as the result of the loss of money whereby he might have gratified his desires. He also had hallucinations of sexual scenes which represented his own desires inhibited by his 'moral sense'. He got out of this conflict by disclaiming responsibility and projecting them as the conduct of others. Auditory hallucinations occurred which were clearly the result of the superimposition of mental images on sensory impressions. This is a perfectly normal occurrence, for no perception is a pure sensory impression, but is always tinged by memory images, though normally any errors which arise from this are corrected by critical judgement. However, if this error is in accordance with expectation, or if the mind at the time is dominated by an emotion such as fear or anger, or still more if it is in accordance with our wishes, criticism will be in abeyance. In the deaf patient, head noises were easily construed as utterances of the spirit doctor which coincided with his own desires.

Why, then, do beliefs depend on passions and desires? Human beliefs doubtless developed in accordance with their utility: and while it is usually the case that utility coincides with truth, this is not always so. It will be to the advantage of an individual if his beliefs coincide with his strivings, and the man who believes his object to be good is more likely to achieve it. Our desires and impulses frequently come into conflict with each other, and a satisfactory mental adjustment consists in so modifying these that they cease to conflict. As a rule the individual tries first to gratify his desires and to make accomplishment fit desires, and it is only when this fails that he tries to fit desires to accomplishments. Contentment is reached when a balance is struck. The Stoics taught to fit desires to accomplishments, but the Epicureans taught to fit accomplishments to desires within certain limits. New countries and young people tried to accept the philosophy of achievement, while old countries and people accept that of resignation, and tend to condemn the former. The success in adjustment in either direction will depend on our beliefs, and if we

believe a thing of little worth we soon curb our desire for it. Another way, however, in which we can get rid of unmanageable desires is by establishing a belief that we have attained what we desired, or that we shall attain it in the future. Normally we are prevented from being led too far from the truth by any belief, by the conflicting desires and beliefs which draw us in the other direction: also by the habitual love of truth founded on the instinct of curiosity: and lastly, the gregarious instinct prevents us from easily setting up our beliefs against those of the herd. Sometimes, however, these checks on the growth of any one belief do not predominate. This is seen temporarily under the influence of a burst of anger, which soon passes: but sometimes it is found that a passion will last for years, and dominate the mind so as to give rise to all sorts of false beliefs. If a man is poor in his habitual love of truth, or if his gregarious instinct is weak, he will more readily establish false beliefs: and it may happen that, as time goes on, the forces which tend to lead him astray gain in strength by making him withdraw from society, and so lose the steadying influence of the herd.

It has been seen, then, that beliefs are established according to their utility, and for this reason it may well be that 'intuitive' beliefs are more serviceable than logical belief. Inasmuch as a false belief is never ultimately a useful belief, we may claim that we are establishing a system of beliefs more and more closely approximating to the truth.

R. G. GORDON.

PSYCHOSES.

[20] War psychoses—the infective-exhaustive group.—D. K. HENDERSON. *Glasgow Med. Jour.*, 1921, xevi, 321.

The writer tilts against the use of the term 'confusional insanity' as only being descriptive of a symptom which may temporarily occur in almost any form of mental disturbance, and deplores that in the official nomenclature no place for the infective-exhaustive group was found. In the etiology malaria took a prominent part, and other factors of considerable importance were 'heat stroke' and 'heat exhaustion'. Whether pure physical exhaustion can be regarded as of any importance in causation has been much debated. Farrar, Aschaffenburg, and Bonhoeffer denied that there was any such evidence: but Henderson thinks that as a secondary etiological agent, following fever, the factor of exhaustion must still be seriously reckoned with.

Analysis of the author's group of cases confirms the view that the different toxic factors which played a part in their production have given rise to similar symptom-pictures. Delirium was the most frequent and most characteristic of all the symptom-pictures in this group of 115 cases, and comprised 36 per cent. The usual history was one of gradual physical exhaustion, with restlessness, sleeplessness, irritability, headache and giddiness, terrifying dreams, and a feeling of being mixed up in the head. Later, disorientation, illusions, and hallucinations appeared, fear was shown, and suicidal attempts were not uncommon. As fever subsided, convalescence quickly set in. Of the cases, 26 belonged to the irritable,

suspicious, deluded group: 19 to the group with depressive hallucinosis: 13 to the dull, apathetic, depressed group: 3 showed stupor: and 4, though placed under the heading of Korsakow's syndrome, are frankly stated to be really 'forgetful, wandering, amnesic states'.

Each patient reacted towards the situation by showing the type of symptoms which a study of his personality would, no doubt, have led one to expect, so that the malaria, dysentery, etc., were only exciting factors and had otherwise no etiological significance. No special predilection to attack the nervous system was noted: but it may be presumed that the affected individuals had inferior nervous systems which were liable to attack from any agent. The prognosis is excellent: in Henderson's cases the recovery-rate was 70 per cent.

C. STANFORD READ.

[21] **Mental hygiene and prophylaxis in France.**—H. COLIN. *Jour. of Ment. Sci.*, 1921, lxxvii., 459.

THE author details the present circumstances surrounding the treatment of mental disorders in France, the law providing only for institutional treatment of certified cases. He states that the inadequacy of the Lunacy Law, which dates from 1838, has been strongly emphasized by the numbers of men suffering from the sequelæ of nervous troubles contracted during the war, as, apparently, in France there is no provision such as the neurological clinics of the Ministry of Pensions in this country, and consequently these cases, not sufficiently serious to be certified—'*les petits menteurs*'—can find treatment neither at the general hospitals nor in the mental institutions.

Dr. Colin describes the formation of a Committee of Mental Hygiene of the Ministry of Health, and that of a more general body—'*La Ligue d'Hygiène Mentale*', which will include lay social workers, and will aim at the prevention of mental disorder on the lines of similar bodies in the United States of America. In addition, he warmly advocates the opening of the general mental institutions to the voluntary patient, and the commencement of out-patient clinics for mental patients. He holds strongly that the neurologist is out of place in handling the case of mental disorder, and maintains that such work should be done by the trained and experienced psychiatrist.

T. B.

[22] **Legislative restrictions in connection with the treatment of incipient insanity.**—W. COROLIER. *Jour. of Ment. Sci.*, 1921, lxxvii., 470.

IN a short article dealing with the treatment of cases of mental disorder in Spain, the author pictures a very deplorable state of affairs, ranging from inadequate asylum accommodation on the one hand, to extraordinarily hampering legislation on the other.

The ordinary process of certification of an insane patient in Spain is, apparently, a most complicated matter, and involves and requires the co-operation and payment of at least six medical and legal officials, none of whom need be specially qualified in the subject: whilst the retention

of a patient in an institution after a period of three months is practically impossible unless the patient is most refractory or dangerous, and unless the relatives are prepared to spend a great deal of money in further fees to officials. The author has seen cases of acute insanity die before the formalities of admission to a mental hospital could be completed, and, not uncommonly, such cases have to be admitted in the first place to the local gaol, or to a municipal dispensary.

Dr. Coroleu observes that, as a result of this legislation, "which embodies all the popular prejudices against lunatic asylums and mental institutions", the early case of mental disorder is never treated in the proper manner, and it is his experience that most cases are kept at home, shut up in one room, and are practically unattended.

T. B.

- [23] **Moonshine whisky psychosis.**—B. LEMCHEN. *Med. Record*, 1922, ci, 280.

THE users of moonshine whisky do not develop the type of psychoses ordinarily associated with alcohol, such as delirium tremens, alcoholic hallucinosis, or paranoid syndromes. Most commonly they develop a stuporous state in which the patient becomes more or less unconscious, and from which he either dies or recovers, and when he does recover he has an amnesia for that period. He may perform almost any act while under the influence of moonshine, but subsequently recollects nothing he has done. This condition is akin to pathological intoxication, or epilepsy, or its equivalent. If any hallucinosis does come about, it is mostly of the visual type, instead of the auditory in chronic alcoholics. Usually strange people are seen, with weapons, who are trying to harm them, and as a rule they have no amnesia differing from that of delirium tremens, where they see mostly animals and have amnesia. Lemchen thinks that this partly goes to prove that the form of psychosis a person develops depends more on the toxins circulating in his body than on inherited tendencies. Apparently different toxins attack different nerve-cells. While the non-volatile alcohol in bonded whisky seems to intoxicate the nerve-cell in the special centres, and we have in the majority of cases different forms of hallucinosis, the volatile alcohols in moonshine seem to attack the nerve-cells in the associated centres, and in the majority of the moonshine cases we have all degrees of unconsciousness, with impairment of judgement. Some cases are given in illustration.

C. STANFORD READ.

- [24] **Disorder of function of the liver in symptomatic psychoses, particularly delirium tremens** (Ueber Leberfunktionsstörung bei symptomatischen Psychosen, insbesondere bei Alkoholdelirien).—A. BOSTROEM. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1921, lxxviii, 48.

If we bear in mind (1) that for the production of delirium tremens there is required, besides chronic alcoholism, some other factor—probably a toxin whose presence is due to morbid alteration of function of the intestine; (2) that the liver of the drunkard, as the frequency of cirrhotic and fatty changes shows, is much exposed to damage; and (3) that one of the

liver's functions is an antitoxic function whose failure allows a flooding of the whole body with toxic substances, we can see how important it is, for an understanding of the pathogenesis of delirium tremens, to investigate the functioning of the liver. To do so by measuring the patient's tolerance of levulose is, in his delirious state, hardly practicable. Hepatic insufficiency can, however, be shown also by the presence of urobilin and, above all, of urobilinogen, in the urine.

The presence of urobilinogen can be detected by addition of a few drops of Ehrlich's aldehyde reagent—a 2 per cent solution of dimethyl-para-amido-benzaldehyde in 5 per cent hydrochloric acid. If urobilinogen is present in pathologically large amount, the addition of this reagent produces, even in the cold, a pronounced red colour. Traces of urobilinogen may occur in normal urines; the reagent having been added, a pinkish tinge appears on warming.

Pathological urobilinogenuria occurs in hepatic cirrhosis, in hepatic congestion, and sometimes in cholelithiasis—not, however, if the bile-duct is completely blocked. In cirrhosis, urobilinogenuria may be permanent; and to investigate by this means the functioning of the liver in delirium tremens we must choose cases in which it is not permanent. Urobilinogenuria is observed also in various infective diseases, especially typhoid fever, pneumonia, and erysipelas. It is noteworthy that these are illnesses which, even apart from alcoholism, often produce delirium, and which, in drunkards, are specially prone to set up delirium tremens. Urobilinogenuria occurs, moreover, after severe hæmorrhages of every kind, in apoplexy, in the hæmorrhagic diathesis, and after fractures of bones; and we know that, in drunkards, fractures of bones are specially apt to set up delirium tremens. In urobilinogenuria following hæmorrhage there is probably no toxic damage of the liver; the hepatic function then fails merely because the elaboration of the resorbed blood-corpuscles makes too big a demand on it. Opinions differ as to whether fever alone can produce urobilinogenuria, but artificial raising of the body temperature in animals does not produce it.

The author has tested the urine for urobilinogen in twenty-six chronic alcoholics. Two of these were patients who, on account of pronounced tremors and restlessness, were sent into hospital as being threatened with delirium tremens; the urine in each case contained some albumin, but no urobilinogen; in neither case did delirium tremens supervene. Twenty-two cases of delirium tremens were examined, and in every one of them urobilinogenuria was observed. Fifteen of them were 'pure' cases, of which three were fatal. Two were accompanied by epileptiform fits. In one case there was erysipelas, in two a slight hæmorrhagic diathesis, in one a fracture of the scapula, and in two cirrhosis of the liver. All the cases had more or less albuminuria. In thirteen of the cases the urobilinogenuria did not begin until after admission to hospital. In five of these it first appeared on the morning of the day in the evening of which the delirium began. In four cases it first appeared a day to a day and a half before the delirium, and in three cases two days before. Only in one case was its appearance delayed until after the onset of the delirium (two days

after onset). The urobilinogenuria was always of brief duration, varying from one to four days.

The author concludes that damage of the liver has probably a causal relation to delirium tremens. A temporary failure of the antitoxic function of the liver can lead to a flooding of the body with abnormal metabolic products, to which the brain, already damaged by alcoholism, responds with a delirium tremens. The failure of liver function is due to an acute exhaustion of the liver-cells, which have been overworked in consequence of the alcoholism.

SYDNEY J. COLE.

- [25] **Some considerations bearing on the diagnosis and treatment of dementia præcox.**—W. A. WHITE. *Amer. Jour. Psychiat.*, 1921, i, 193.

Though Bleuler has endeavoured to group the symptoms of dementia præcox and show their relationship, the underlying factors which bind them together into a diagnostic unit have not as yet been sufficiently defined. The several levels—vegetative, neurological, psychic, and social—should be synthesized. At present a formulation at the psycho-social levels meets the case best. Regression is the fundamental mechanism, and the symptoms are either regressive or efforts to escape from this tendency. Dementia præcox is a regression psychosis with a malignant trend, this latter depending upon the depth of the regression ontogenetically and the inclusion in the process of archaic phylogenetic material. It is because of this that the productions of the præcox seem so alien to us compared with other psychoses, and that the patient so lacks insight and fails to appreciate the personal source of his symptoms which tap the ultimate sources of psychic integration.

All through the symptomatology we see evidences of segmental overdomination, which are especially marked in the oral and anal zones, the skin areas, muscle segments, and respiratory zones, thus implicating organs and functions which are expressed at all the levels, and showing that the regression has gone deep enough to unloose bits of psychological mechanism. Though the archaic cannot be identified at the symbolic level, it must be there, and it is suggested that the unanalyzable residue of unconscious material represents what is phylogenetic. Herein, White would include delusions identifying certain excretions with the personality—delusions of food and air as impregnating material, cannibalistic symbols, water as a birth symbol, mythological animals, and certain delusions concerning the heavenly bodies. Dementia præcox is therefore looked upon as a profound defect of biological adjustment. There are other regressive states indistinguishable from early stages of præcox, so that diagnosis by outcome must often be resorted to.

The claims to cure præcox are not regarded as well founded. Treatment must lie in presenting to the patient a possibility for the utilization of whatever creative tendencies he may have, which will at any rate tend to obviate further regression.

C. STANFORD READ.

NEUROSES AND PSYCHONEUROSES.

- [26] **The causes and treatment of juvenile delinquency.**—CYRIL BURT.
Psyche, 1922, ii, 232.

THIS is the first part of an article founded on the author's experience of juvenile delinquents referred to him for psychological examination. In looking for causes, multiple determining factors are encountered. In gauging the criminal's intelligence, standardized tests are applied. The author fails to agree with the general opinion that the most important psychological cause is mental deficiency, and thinks that facts and figures have been over-stated. He finds that 7 per cent of juvenile delinquents tested with the Binet-Simon tests are mentally defective. Among girls and adults the proportion is higher still.

When young, the delinquent defective, owing to his suggestibility, is the dupe of others who are more intelligent. When older he plays a more active rôle and intimidates children younger than himself. His offences are more frequently the result of blind and childish impulse than of intelligent deliberation. There is no sharp line between mental backwardness and deficiency. Thirty per cent of delinquents are classifiable as technically backwards in general intelligence. Deficiency may be regarded as an extreme degree of backwardness. The backward delinquent during schooldays readily takes to a life of habitual truancy. In some degree he makes up for his incompetence by shirking, lying, and finally by stealing.

In considering treatment, the author finds complete psycho-analysis useless owing to the lack of intelligent co-operation: he has obtained better results from deep hypnosis. Suggestion should be positive and concrete rather than negative and abstract. If the child is intelligent enough, the full technique of psycho-analysis is advocated.

In considering the merely ignorant delinquent, the author finds that 98 per cent are below the average, and 42 per cent are classifiable as technique-backwards. Secondary educational backwardness may be due to causes of a physical or temporary psychological kind. These cases of educational backwardness are more hopeful from the point of view of psycho-analytical treatment. It is considered important to create fresh interests in the home life, and in this it is advisable to obtain the co-operation of the parents.

ROBERT M. RIGGALL.

- [27] **Analysis of a conversion hysteria superimposed on an old diffuse central nervous system lesion.**—P. R. LEHRMAN. *Jour. Nerv. and Ment. Dis.*, liv, 31.

THE author describes a case of a hysterical tremor of the hands superimposed on an old Friedreich's ataxia. He carried out a full analysis, with the result that he found that the tremor represented an activity of the patient's hands which prevented her carrying out less desirable actions (masturbation, and doing injury to her small sister, of whom she was jealous). He also found that she was very badly adapted to her family life, with marked ambivalent feeling for her father, and repression of sexual impulses, of

which she was afraid. The result of treatment was satisfactory, and not only did the tremor cease, but she became possible at home. There can be no question of the importance of recognizing and treating hysterical symptoms superimposed on organic nervous disease, and although complete analysis is not necessary to remove the symptom in every case, the mental maladjustments towards life should not be overlooked.

R. G. GORDON.

- [28] **Emotional episodes among psychopathic delinquent women.**—
E. R. SPALDING. *Jour. Nerv. and Ment. Dis.*, liv, 298.

THE material is derived from girls in a reformatory amongst whom emotional crises were common. The sources of emotion were: (1) The thwarting of desires in those who had not learnt to control their egotistic impulses; (2) Breaking down of secondary anti-social compensations which had been built up to console the patient for thwarted infantile desires: such compensations often took the form of screaming fits, lying, and stealing; (3) The activation of the deep-seated unconscious sense of inferiority. The behaviour of six cases is described in detail, and light is thrown on the regressions and maladjustments and their compensations. There can be no doubt that the study of the mentality which is responsible for delinquency is of the utmost importance: for, although the lessons that are learnt may not make it possible to cure those who have already reached adult age, if they are sufficiently taken to heart by educationalists and social workers we may hope for prevention in the future by more careful study of infantile and childish adjustments.

R. G. GORDON.

- [29] **The neurotic element in organic cardiovascular disease.**—
S. NEUF. *N. Y. Med. Jour.*, 1922, cxv, 80.

ATTENTION is drawn to the rôle of neurotic and psychic disturbances as initiators of symptoms in those with organic cardiovascular disease, and its insufficient recognition. Quite commonly patients with heart disease get along fairly comfortably until some untoward psychical factor initiates symptoms from which it may take months to recover, or cardiac stability may never be regained. So much stress is laid upon physical signs that apparent minor factors in the history are not attended to. Mental disturbances have, especially in mitral stenosis, a markedly deleterious influence. Thus tachycardia and over-forceful action may be brought on while previous examination of the heart revealed no clinical characteristic which seemed to render it susceptible to nervous influence. Auricular fibrillation is also markedly affected by a neurotic insult.

SOME illustrative cases are given which show why such symptoms as tachycardia and auricular fibrillation are not controlled by the usual remedies, and why the prognostic viewpoint regarding them cannot conform to the usual ones in which the neurotic factor is absent. In addition to drugs, psychotherapeutic measures should play an important part in the treatment.

C. STANFORD READ.

PSYCHOPATHOLOGY.

[30] The school medical service in relation to mental defect.—G. A. AUDEN. *Jour. of Ment. Sci.*, 1921. lxvii. 475.

OBSERVING that, as a large proportion of children and young adults now come under continuous medical supervision, it is now feasible to investigate the problem of mental deficiency as it is manifested in childhood and early adult life, the author gives his opinion that only by such investigation can any real progress be made.

He reviews briefly, in their chronological sequence, the various stand-points from which the matter has been treated, namely, the primitive theurgic, the compassionate, the educational, the sociological, and the eugenic; and he selects the educational and the sociological modes of approach as the two which fall within the range of present practical politics, the former exemplified by the Elementary Education (Defective and Epileptic Children) Act of 1899, the latter by the Mental Deficiency Act of 1913.

Taking the educational standpoint, the author indicates the two-factor theory of intellectual capacity, where one factor is the general intelligence due to the functioning of the brain as a whole, and which is purely innate; while the other consists of the specific capacity for acquiring and using the complex language symbolization, which is related to the functioning of certain focal areas of the brain, and upon which the educational capacity so largely depends. Although the two capacities do not necessarily go hand in hand, yet the author has observed that a more or less marked condition of dyslexia is to be found in association with a general intelligence defect. He illustrates the point by examples, and draws attention to the analogy which the specific defect presents to the disorders of speech, and of other aspects of symbolic thinking and expression, shown by adults suffering from brain injuries, etc.

From the sociological standpoint there are many problems awaiting investigation. Here Dr. Auden lays stress on the effect of unpleasant experiences followed by repression, such experiences not being necessarily sexual, upon the subsequent conduct of the child; and he also indicates how juvenile delinquency may arise from the love of adventure, from phantasy building, or from the limited scope in town life for the self-expression of the normal interests of youth. These problems of maladjustment and maladaptation amongst children are to be regarded as of the greatest sociological importance, for it is "the experience of childhood that gives colour to the whole emotional content of the outlook on life and the resulting behaviour of the adult".

The author outlines other important fields for inquiry which have not been touched so far, such as the study of the emotional reactions and anomalies of the affective processes which are exhibited by the feeble-minded as a class; and, in this connection, he remarks that it has never been pointed out how closely these resemble the description given by McDougall of the emotional characteristics of the unorganized crowd. Reference is also made to the extraordinary moral change which may be

observed in the child who has passed through an attack of encephalitis lethargica.

In considering how these demands for research and investigation can be met, Dr. Auden feels that there is an urgent need for the establishment in this country of psycho-educational clinics, the scope of which should be sufficiently wide to include the examination of all children presenting abnormalities of education or of conduct. He states here what has been done in this direction in the United States of America. As regards the staffing of such a clinic, he feels that neither the asylum or prison services nor hospital practice affords the opportunity for the acquisition of a sufficiently broad basis of knowledge of the normal as well as of the abnormal psychological states. In his opinion the provenance of the school is the best training-ground for the medical officer who is to staff the psycho-educational clinic, and he thinks that the school medical officers should be encouraged to take the Diploma in Psychological Medicine, which should be extended to suit their needs, and should include more of sociological science than has been the case hitherto.

The author urges that the special training of the school medical officer in this branch of medicine is of much importance at the moment, as otherwise the psychological investigation of the problems of the child will pass into the hands of the pedagogic, and away from the medical, side of educational administration. Especially is this to be emphasized in view of the fact that the popularity of psycho-analysis and the 'new psychology' is tempting many persons, both medical and lay, whose knowledge of psychology is of the slightest, to attempt psycho-analytic methods in handling children. He concludes that "the results may not be so serious if the agent be a medical practitioner, for he will soon realize his limitations; but if psycho-analysis is undertaken by persons unqualified to distinguish between the organic and the functional, between the true and the false inferences of inductive logic, disaster is certain".

T. B.

[31] **Symposium on the relative rôles in psychopathology of the ego, herd, and sex instincts.**—*Jour. Abnorm. Psychol. and Social Psychol.*, xvi. 4. 217.

I.—*The Ego Instinct* (BERNARD GLUECK).—Glueck deprecates the tendency to regard physiological processes or biological phenomena, which may very well explain things in the behaviour of the dog and cat, as absolute criteria for guidance to the psychological understanding of the behaviour and endeavours of man. For psychiatry and psychotherapy, behaviour reactions, ambitions, strivings, successes, and failures must be recognized as 'human values'. They are unique as values because they are human values. As such they have no community of purpose with the dog or cat. Nevertheless he does not wish to give the impression that he is not in full sympathy with research in comparative anatomy and physiology, and with the efforts of the behaviourists.

Instead of dealing with the crude and unmodified ego-instincts, Glueck finds it more useful to take as starting-point what Tansley terms the ego-complex, since it is essentially with instinct as modified by experience and

organized into patterns of behaviour that we have to deal in the human being, and not with simple conations. This leads straight into the realm of human values, and permits us to grapple with the ego's strivings, desires, achievements, etc., rather than with crude ego-trends. The simple delineation of fundamental human desires in terms of humanly appreciable values which he advocates, is one proposed by Professor Thomas: (1) Desire for security; (2) Desire for recognition; (3) Desire for more intimate response (love, adoration, etc.); (4) Desire for new experience.

'Character' is determined by the nature of the organization of these desires. The dominance of any one of the four types of desire is the basis of our ordinary judgement of character. Personality, on the other hand, is the individual's conception of himself. We cannot conceive of the ego apart from sex and herd attributes. What renders the ego-complex pathological? In most cases it is pure speculation to try to determine what the situation may be congenitally. Even in such definite mal-developments of personality as epilepsy, we are perhaps still too apt to emphasize the possible congenital modifications of the ego. It is becoming more and more recognized with regard to those states which we are in the habit of stigmatizing in rather a facile fashion as defects, that life experiences, in the broadest sense of the term, are the real determinants of character and personality.

Glueck stresses the importance of recognizing the frequency of pathological exaggeration of the ego as a compensatory manifestation rather than an inherited fixed and unchangeable anomaly of make-up. This occurs often through educational standards being pitched at a higher level than individual ability, and perhaps still more through the growing desire of the modern parent to wish to re-live his own life only in a 'maximated' degree through the lives of his children. In both cases maladjustments result from the discrepancy between aspiration and endowment. These maladjustments range from crushing of the self, with persistent timidity and lack of morale, to a frantic kind of compensatory exaggerated egoism.

The roots of these pathological exaggerations or elaborations of the ego-ideal, even the main objective of the frantic drive for self 'maximation', are unconscious.

II.—*The Herd Instinct* (SANGER BROWN).—The author says nothing new about herd instinct, but passes in review, in a suggestive way, manifold aspects of the conflict between individualistic and herd tendencies. He shows that in modern life, in place of a very large body of public opinion there are many more small groups than in the past, to which the individual may attach himself and so avoid intellectual isolation. Herd instinct is a great leveller. It brings the mass of people to certain supposedly desired standards of conduct. At the same time it prevents or retards the development of the enlightened few.

He goes on to criticize the narrower Freudian psychology of the past, in which he says treatment has dealt almost exclusively with the individual regardless of his social environment. It is probable that in the future greater emphasis will be placed upon what has recently been termed 'the situation types' of neuroses and psychoneuroses.

Passing to the more academic side of the subject, he sees an analogy between certain types of thinking seen during early racial development, when herd instinct appears to have been much in evidence, and the modes of thinking seen in psychopathology. He suggests that much of the material both of the day-dreams and night-dreams of neurotics is indicative of an atavistic or regressive reanimation of primitive 'group thinking' in which any definite sense of personality seems to have been undeveloped. He quotes Miss Jane Harrison's *Themis* to show that primitive man, in his collectivism, hardly regarded himself as entirely separate and distinct from other people, and still less from inanimate nature. Many psychiatrists feel that this deficient sense of personality is the significant thing in certain types of dementia praecox. In these cases modern adapted personality becomes swamped in a welter of primitive herd imagery, or, as Jung would say, in the 'collective unconscious'. He suggests that certain people, of our own generation, because of their interest in occultism, mysticism, and so-called new cults, which are really old cults, belong to the same category, although in less pathological forms. Integration of personality therefore is a process which takes place in spite of the inertia of primitive and unconscious herd imagery, which makes for dissolution and disintegration of personality, as in delirium, altered personality occurring in hysteria, dream states, deep abstractions, stuporose conditions, and other disturbances of consciousness.

III.—*The Sexual Instinct* (C. MACFIE CAMPBELL).—The writer chiefly devotes himself to the much-discussed question as to what may be called sexual. He considers it an unwarranted generalization to assume that in normal development the pleasure associated with a great variety of organic sources, from cutaneous sensations, from rhythmic movements, from distention of bladder and rectum, has a sexual quality. To claim that all such pleasures are of a sexual nature is to assume that all organic pleasure is sexual. It is to beg the question. Such abuse of language makes mutual understanding difficult. To a large extent this *petitio principis* is involved in the use of such terms as muscle-eroticism, anal-eroticism, etc.

Further, where a specific sexual activity is repressed, to assume that alternative activities must necessarily be sexual is not sound. The hungry man, recognizing that no personal efforts yield any chance of a meal, may, to distract himself, plunge into some interesting study, and while he is engrossed in this the tendency to hunt for food is temporarily in abeyance. The study, however, is not a nutritive activity nor a sublimated expression of the hunger instinct. It is simply different. Similarly, activity of obviously sexual nature may be superseded by other activity without the latter showing any special sexual quality; the energy of the individual, potentially available for sexual activity, may be actually used for other purposes. If all those purposes are invariably regarded as sublimations of sexuality, then either all life is sexualized, or the term sexuality ceases to have any specific meaning.

Thus the writer makes a plea for a less schematic and dogmatic formulation of the facts of human behaviour which are related to our sexual life.

He does not wish to minimize the extremely valuable contributions to human psychology made by those who have pushed their formulations to an extreme: but the time has come for a sober evaluation of these contributions, with full recognition of the complexity of the facts. It is easy to juggle with clean-cut instincts and with a docile libido, but satisfaction with such juggling is apt to warp our observation, and lead to rigid formula!

IV.—*Synthetic View of Ego, Herd, and Sex Instincts* (JOHN T. MACCURDY).—MacCurdy begins by reviewing briefly the phylogeny of man. In normal man, instincts exist which interact and produce what we call normality. It is unthinkable that one group of instincts could be responsible for all psychopathological reactions, unless it could be shown that the human mind is resistive to all strains, except those of one class, or that only one strong primitive instinct survived since barbarous times, to spring into prominence when the instincts peculiar to civilization were dissipated. We should not, therefore, expect to find one formula covering all abnormal reactions, any more than one instinct would be expected to guide the life of man. Few, moreover, are capable of searching for many unknowns at once: singleness of purpose seems essential as a stimulus to research. Freud's theories, which centre round the sex group of instincts, have provided the necessary impetus for initial investigations in dynamic psychopathology; but the time has come to consider more catholic views. Other theories, such as those of Shand, MacDougall, and Prince, have been less productive of enthusiastic research, because the long catalogues of instincts postulated or inferred by these authors are too diffuse. From a dynamic standpoint their analyses become rather facile, new instincts being easily hypothecated to account for new reactions. Dogmatism is so far avoided as to make an invertebrate system; but, on the other hand, disputes as to existence or non-existence of separate minor instincts degenerate into sterile academic discussions and wordy squabbles. Such detailed and unfocused formulations have, pragmatically, a tendency far opposite to Freud's.

The middle ground between the two is reached by separating instinctive reactions into groups, inherently antagonistic *a priori*. These groups are ego, herd, and sex. If clinical experience demonstrates certain abnormal reactions to be definitely related to preponderance of one group over the others, then this grouping has pragmatic value. It is difficult, but not impossible, to study the interaction of these three groups. MacCurdy goes on to show the specific ways in which the interaction of these three factors may determine morbid psychological conditions. The end-result in all such conditions seems to be unreal thinking of the type which Sanger Brown calls primitive herd thinking. He corroborates the latter's suggestion that it is always this type of thinking which occurs in the psychoses.

The article is too long, and the thinking involved in the working out of the inter-relation of the three instincts too complex, to allow of abstraction. The concluding paragraph may, however, be quoted: "An answer must be given to the question in all your minds, 'What of predominant herd instincts?' This condition does occur, but, sad to say, the product is not considered pathological. Herd conduct is the standard of

normality. Hence one who conforms more than his neighbours is held to be the worthiest and most normal of citizens. Yet rampant herd instinct is the greatest enemy to human evolution. Ego and sex instincts, when in the ascendant, lead to the destruction or ineffectiveness of the individual. Herd solidarity, however, which should merely act as a balance-wheel, in practice is a locked brake. The genius who is ahead of his time is subject to the same distrust or persecution as is the lunatic or criminal who lags in evolution. It is herd instinct which stones the prophets, burns Galileo, puts convention above abstract justice, cements the uncritical electorate, rushes wildly into war. The world of men suffers, and has suffered, more from such tendencies than from all crime, insanity, or nervousness."

JAMES YOUNG.

Reviews.

Pathology of the Nervous System. By E. FARQUHAR BUZZARD, M.A., M.D., F.R.C.P., Physician to St. Thomas's Hospital, and J. GODWIN GREENFIELD, B.Sc., M.D., M.R.C.P., Pathologist to the National Hospital for the Paralyzed and Epileptic. Demy 8vo. Pp. xv + 334. Illustrated. 1921. London: Constable & Co. Price 35s. net.

THIS volume is written by a clinical neurologist of high reputation and mature experience, in collaboration with the pathologist to the National Hospital for the Paralyzed and Epileptic in Queen Square, London; and the intention is to furnish medical students and practitioners with the data which link up the structural changes in the nervous system with the clinical signs of nervous disease, and so presumably to supplement the various books on the subject, which, so far, have been mainly clinical.

One may say at the outset that the task the writers have shouldered is one of great difficulty, and demands much discrimination in the selection of those principles and facts which should enable the unspecialized practitioner of medicine and the unqualified student to understand the cause and the localization of nervous lesions.

Almost the whole field of neuropathology has been touched upon in a rather superficial manner, and in a certain measure the views expressed are a representation of current work on this subject. There are some chapters which are particularly good, which are broad in outline and free from unnecessary details—for example, those dealing with syphilis, tetanus, poliomyelitis in its various forms, lethargic encephalitis, rabies, and other infective conditions; but there are other portions of this work which the authors would do well to revise and supplement in subsequent editions. One would like to suggest in this connection that the introductory pages dealing with the neurone, the neuroglia, etc., be considerably amplified; and that more consideration be given to such questions as the 'sympathetic' and 'endocrine' influence on the central nervous system. This, one feels, would be helpful in conveying a broader and more comprehensive view of the subject.

In a work such as this there are, doubtless, many points of a controversial nature, and a few arise in the reviewer's mind, such as that corpora amylacea (p. 24) receive less attention than the myelogenous bodies so frequently met with in primary myelin degeneration of the cord; that the origin of compound granular corpuscles (p. 29) should be dealt with in a broader manner; and that the description of the changes in general paralysis of the insane should be rewritten (pp. 155-6). After all, this disease is a very definite clinical entity with a remarkably definite morbid

histology, and is worthy of a fuller description than we have in the book before us. As a matter of fact the histological examination of the brain and cord of such cases is an education in itself.

The work can be recommended as a new phase in British neurological literature. We required a book of this nature in English, and it is welcome; but if, in the future, the authors can see their way to enlarge on the subject and lay down the problems, in so far as we know them at present, which concern neurological research, one can predict a much larger sphere of usefulness for a volume which lends itself so naturally to expansion. In conclusion, one would remark that the subject matter is clearly expressed, and that the illustrations are excellent.

D. ORR.

Instinct and the Unconscious: a Contribution to a Biological Theory of the Psychoneuroses. By W. H. R. RIVERS, M.D., Fellow and Praelector in Natural Science, St. John's College, Cambridge. Second edition. Large 8vo. Pp. viii + 277. 1922. Cambridge: University Press. 16s. net.

THE second edition of Dr. Rivers' book does not differ in marked degree from the first, save in the addition of two new appendices: its appearance is a proof of the popularity of an attempt to compare the functional disorders of mind and nervous system with the concepts held by biologists and physiologists.

Such a book may be analyzed either from the standpoint of the psychologist or from that of the physiologist, and it is from the latter that this present review is written. It may be said at once that, brilliant as the psychological reasoning contained in the work may be, the physiological treatment of the subject is by no means free from criticism.

Dr. Rivers treats first of the 'unconscious' and then of 'suppression'. His definitions are not very exact, and it would appear that the word 'unconscious' is used as an adjective to qualify that experience which cannot be brought into the field of consciousness by any ordinary process of memory or association. Again, 'the unconscious' appears to be composed in part of such unavailable experience (if we interpret aright). 'Suppression' is that process by which experience becomes unconscious.

Here, then, we have two things—experience and the suppression of experience. It appears to be Dr. Rivers' argument that the experience which is suppressed is painful experience, and that the suppression occurs because of the discomfort which would otherwise be incurred. He goes so far as to say (p. 20) that the experience which tends to be forgotten or repressed is the immediately painful. As the word 'repression' denotes here a conscious process, we must infer that those things which are put out of the mind are usually painful. This is probably incorrect. The writer of this review finds (in common with many others) that the major part of active repression in everyday life is occupied in putting away the memories of pleasant experience—green fields and streams—that the mind may concentrate upon its problems.

The biological portion of the book is mainly occupied in the finding of

physiological parallels for 'suppression' and in an inquiry into the nature of that which is suppressed. Dr. Rivers proceeds from the lower levels upwards. In an attempt to find a relationship between psychological 'suppression' and physiological 'inhibition', he first takes Dr. Henry Head's views of the afferent nervous system and accepts the distinction between protopathic and epicritic sensibility. In this connection he describes some observations which may be interpreted in terms of the inhibition of the former by the latter, and commits himself to the statement (p. 27) that this is "the expression of a purely physiological process in the peripheral [sic] nervous system". Still keeping to the afferent nervous system, Dr. Rivers next states that there is a relation between the cerebral cortex and the optic thalamus similar to that between the epicritic and protopathic afferent nervous systems.

Turning then to the reflex, he states that "the whole process is immediate and incapable of modification" (p. 28), and proceeds to a discussion of the results of Head and Riddoch. In these he again finds a parallel to psychological suppression. The 'mass-reflex' described by these observers is a "peculiar form of reflex with characters unknown when the nervous system is intact" (p. 28). This reflex is wholly suppressed in the normal man, and appears in cases of transverse lesion of the spinal cord when it is released from the control of the higher parts of the nervous system. The conclusion at which the author arrives is that the suppression of conscious experience is only one example of a widespread process—the universal physiological property of inhibition. The 'unconscious' now becomes re-defined as that which has required to be suppressed.

What is this which is suppressed to form the unconscious? It is experience of a particular nature—experience which has been accompanied by strong emotional tone; so, at any rate, Dr. Rivers deduces from the examples of suppression which he selects to illustrate his argument. But he points out that much of the detail which may be forgotten or suppressed is of neutral emotional tone, and he assumes that the suppressed experience carries associated experiences with it into the unconscious. He posits a close relation between emotion and instinct, and comes to the conclusion that the content of the unconscious is made up of feelings and affects which form the conscious aspect of instinctive reactions and tendencies, and of sensory and intellectual elements which have been associated with these reactions.

It now becomes necessary to inquire into the nature of instinct. It is, however, the case that no attempt is made to tell us what the author means by this word—although various properties of instinct are postulated. Instinct appears to be something which is innate and different from intelligence (which is acquired). Emotions, such as fear or anger, are expressions of instinct; and behaviour which can be ascribed to instinct tends to be of 'all-or-none' character. Great play is made with this 'all-or-none' principle. Aradian's experiment on peripheral nerve is described: the 'all-or-none' principle is stated to apply ('practically') to protopathic sensibility; the reactions of an animal exposed to danger are stated to 'tend' to be maximal or nothing (p. 44); of all the spinal reflexes, he selects

Sherrington's 'extensor thrust' as exhibiting the 'all-or-none' character [this relatively unimportant reflex is almost the only example the author selects out of the domain of experimental physiology, and he ignores the fact that the majority of spinal reflexes are characterized by properties of fine gradation]; the 'mass-reflex' is again cited; even the 'all-or-none' contraction of heart muscles is used in the argument—as of especial importance owing to the close relations between the heart and affective disturbances, and with a complete ignoring of the finer variations which occur in the frequency of the heart beat.

As a result of this argument a conclusion with regard to the characteristics of a certain class of instincts is attained. These are such that they exhibit an absence of exactness of discrimination, of appreciation, and of graduation of response. A final analogy is obtained from the work of Head and Holmes, who are stated to have 'shown' the essential nucleus of the optic thalamus to be the central basis of emotive reactions, for which the above characteristics hold good. [It is worthy of note that the reactions in question were largely speech reactions!] Dr. Rivers then takes the bold step of calling this class of instinctive reactions 'protopathic', and the remaining instinctive reactions 'epicritic'.

Dr. Rivers next seeks a reason for suppression of certain experience. He thinks that some of the instinctive reactions are subject to the 'all-or-none' principle, and states (p. 61) that "even in man there is no graduation of the rapidity and length of a flight accompanied by definite fear"! Unless these instincts are suppressed, the manipulative reactions (such as the direction of an aeroplane or the shooting of an arrow) will be inefficient. Hence the accurate discrimination necessary for continued life calls for a suppression of the thorough-going 'all-or-none' instincts. This surmise leads to an interesting speculation with regard to the evolution of man. It is assumed that at one time his ancestors took to an arboreal life. Before this, they removed themselves from danger by flight along the ground—flight which consists in the simple and wholly instinctive movements of running. With the tree life there arose more delicate and discriminative adjustments of eyes and limbs, made necessary by the different complexities of their new environment. But surely the ground was then no even surface like a garden lawn, and surely it called for as delicate and accurate 'discriminations' as the branches of a forest?

We have now covered the main part of the physiological argument of the book. It presents an interesting speculation, made not the less interesting for the author's obvious enthusiasm for his subject. As a mere speculation it might stand; but if it is seriously put forward to be a true picture of our physiological views and a reasoned statement from the standpoint of exact science, a more close analysis must be made.

Unsatisfying features of the physiological side of the book are presented by the author's use of terms, by his description and selection of facts, and by the method of his argument.

With regard to terms, a marked feature of the book is the absence of exact definition and the attachment of different meanings to the same word. Thus the word 'reaction' appears to be used in the physical sense in one

place (p. 53, 54) where it is applied (as 'instinctive reaction') to the acts of flight and of crying; but in another place (p. 49) it appears to be used in a psychological sense where 'instinctive reactions are buried within the unconscious'. Occasionally we find a comparison of incompatibles, as (p. 17) where 'suppression' is said to occur as a result of physical or mental shock—a psychological function conditioned either by a physical or by a psychological stimulus!

It will be seen, from our description of Dr. Rivers' argument, that he builds it up by comparing a series of selected observations. But a closer investigation demonstrates the fact that the foundations upon which he builds are largely speculative, and that he makes little or no effort to secure their stability.

Thus, Dr. Henry Head's views on the mechanism of the afferent nervous system—with its protopathic and epietric divisions—are at the very basis of the argument. The results have been challenged by Boring (1916), and have been reasserted by Head. So important is Head's view to the argument of the book that the writer might well have referred to the challenge and given his reasons for setting it aside. Again, weight is given to the views of Head and Holmes on the function of the optic thalamus. Careful as the work of these two observers is, the conclusions to which they come are speculative; their localization of a particular function in the thalamus is only one of many possibilities, and the others have not been excluded. Such a foundation is insecure. Arrian's 'all-or-none' experiment is inaccurately described, and the reader finds that what is really a possible inference from the experiment is stated as a scientific finding which is used in the argument of the book.

In view of the admittedly close relation between 'instinctive' and reflex reaction (p. 38), we would have expected a considerable discussion of the spinal reflex. Out of this great field the author selects merely the 'extensor thrust' (an 'all-or-none' reflex) and ignores the occurrence of the multitude of graduated reflexes. The scratch-reflex with its gradation in local sign and in intensity, the flexion-reflex with its minute gradation in intensity, the finely-graded proprioceptive reflexes, all are alike ignored. The author confines himself almost entirely to the 'mass-reflex' as described in spinal man by Head and Riddoch. As regards the limb-movement component of this reaction, we are merely dealing with the flexion-reflex as described by Sherrington. This exhibits little or no variation with variation in the locus of the stimulus, but a very fine gradation with variation in the intensity of the stimulus—it is the worst example of 'all-or-none' reaction which could be selected. Nevertheless Dr. Rivers fixes his attention on the absence of local signature (p. 28), and states that there is complete absence of relation between intensity of stimulus and reaction in the case of the mass-reflex (flexion-reflex?) which he classes as an 'all-or-none' reaction! A broader selection of examples of reflex action would have shown an absence of the 'all-or-none' principle in the greater number of them.

The mode of argument used in the book is largely that of special pleading. An instance may be given in the use of the word 'suppression' which

denotes "the process by which experience becomes unconscious" (p. 17). In the fourth chapter of the book an attempt is made to show that suppression is related to certain physiological processes (p. 22)—in short, to inhibition (p. 31). Yet the author persistently uses the word 'suppression' for the physiological 'inhibition' throughout the chapter in which he is attempting to show that the two processes are similar, thus suggesting to the reader that which he tries to prove. To speak at one place of the suppression of psychological experience (p. 22), and at another of "experience suppressed on the sensorimotor and reflex levels" (p. 34), seems to be a misuse of terms.

Another aspect of this mode of argument is the exaltation of theory until it becomes equal in value to fact. *Perhaps becomes is*; *nearly* changes into *quite*, as the argument proceeds. Thus the author states (p. 46) that it would strengthen his argument if it could be shown that protopathic sensibility obeys the 'all-or-none' principle. He finds that this is "practically, though not completely, the case". Yet on the next page it turns out that any exact relation between stimulus and reaction is 'wholly' absent in the case of protopathic sensibility. Again, it is the author's thesis that suppression especially (or even 'only') occurs when the emotions have been strongly aroused (p. 35). Yet he admits that much of the experience suppressed is of a 'neutral' (that is, unemotional) kind. This is a crux; and to remove it, he assumes as "at least a *legitimate hypothesis* that this experience has come to form part of the content of the unconscious on account of its association with experience which needed suppression because of its painful nature" (p. 36). Yet on the following page this hypothesis takes on the habit of fact: for we read that "*it has been found* that experience which becomes unconscious through the agency of suppression either belongs definitely to the affective aspect of mind or, when intellectual in character, has been suppressed on account of its association with affective elements". There is no attempt in the intervening paragraphs to remove this speculation to the realm of fact.

It is perhaps ungenerous to criticize a book which is so pleasant to read and so stimulating in its thought. But the book is a frank attempt to bring psychological and biological concepts into relation one with another. This aim naturally suggests that the physiological presentation is made in the strict convention of exact science. The great reliance here placed upon the value of hypothesis and theory is not part of that convention; and the author's attitude may perhaps be surmised from a statement which he makes in his introductory chapter. There, writing of pathological mechanisms and causes, he states (p. 4) that "few will find it worth while to study the details of a structure [i.e., mechanisms] resting upon foundations [i.e., causes and conditions] they reject". This statement appears to glorify theory to such an extent as to suggest that few investigators will apply themselves to facts if they are uncertain of the theory. Yet it is just in these very circumstances that the investigation of facts becomes of greatest interest. The advance of physiology occurs because of (and not in spite of) distrust and dissatisfaction; theory and hypothesis are temporary scaffolding, the servants of science, not its mistresses.

The book is really a *tour de force* written in the psychological convention. Selected physiological facts are used: but they are treated in the psychological manner. The chief importance of the book lies in its mental stimulation: and it may well point a way towards a physiological treatment of the data obtained by psychologists.

T. GRAHAM BROWN.

Morbid Fears and Compulsions: their Psychology and Psycho-analytic Treatment. By H. W. FRINK, M.D., Assistant Professor of Neurology in Cornell University Medical College. With an Introduction by JAMES J. PUTNAM, M.D., Emeritus Professor of Neurology, Harvard University. Pp. xxiii + 344. 1921. London: Kegan Paul, Trench, Trübner & Co. Ltd. 21s. net.

THE majority of books on psycho-analysis are either written on popular lines, presumably for the layman, or else they consist of a collection of papers or lectures which fail to give a systematic account of the subject. Such criticisms are not applicable to this volume, as it provides a fairly comprehensive account of Freud's psychology, and is written for those who already know something about psycho-analysis and are desirous of learning more, with the intention, in some instances, of using it in practice. The earlier chapters are devoted to the more theoretical aspects of psycho-analysis, and give an account of the infantile sexual theories, the unconscious, repression, the pleasure principle, dream psychology, the mechanisms of psychopathological manifestations, and the neurosis as a whole. Then follows an account of the actual analysis of a case of compulsion neurosis which occupies a whole chapter of seventy-three closely-printed pages. The various stages in the analysis are clearly described, but it does not demonstrate, as the author himself subsequently points out, the influence of the infantile sexual factor in the production of the neurosis. Another criticism which suggests itself is that concerning the memories of the patient elicited by the analysis. These do not appear to have required any special technique to bring them into consciousness, and the question naturally arises as to what the psycho-analyst really means by repression, resistance, and the content of the unconscious. Though the analysis enabled the patient to correlate her various experiences with her morbid symptoms, it does not appear that these experiences were inaccessible to consciousness even at the beginning of the treatment. On the contrary, the final 'secret' elicited could have been revealed at the first, and it was deliberately concealed, rather than rendered 'unconscious' in the Freudian sense. This comment is made, not with the purpose of questioning the value of the psycho-analytic procedure as a means of straightening the tangles of the mind of a psycho-neurotic, but rather with the view of questioning the validity of the distinctions made between memories out of the focus of attention at any given moment, those which are suppressed, and those which are repressed or unable to be recalled. The author does not make these points at all clear in his theoretical discussions, and many of his readers will probably find his conception of a structural unconscious rather

confusing, notably as to whether it is a source of instinctive energy or a storehouse of concrete experiences.

Two chapters are devoted to anxiety hysteria, and another long analysis of a concrete case is described in detail. The book concludes with an interesting discussion of the psycho-analytic cure, and an attempt to elucidate its theory and mechanism. The late Dr. J. J. Putnam had written an introduction to this volume in which he had explained the philosophic grounds on which he was unable to agree with the Freudian doctrines of human behaviour. This is included in this edition, which is a reprint of one previously published in America. In the preface Dr. Frink refers to cartoons from the *New York Times*, the *New York Tribune*, and the *Louisville Times* which are reproduced in Chapter III. These are referred to in the text, but, rather unfortunately, the publishers have omitted to reproduce them, and the value of the author's comments is thereby somewhat diminished.

H. DEVINE.

Ueber die Entstehung der Negrischen Körperchen (On the Origin of Negri's Bodies). By Dr. LADISLAUS BENEDEK and Dr. FRANZ PORSCHE. Pp. 86, with 10 plates. 1921. Berlin: S. Karger. M. 10.

It was in 1903 that Negri first described, in animals dead of rabies, peculiar 'bodies' in the central nervous system, regarded by him as of the nature of protozoa and as the cause of the disease. They have ever since excited much interest and research, but their exact nature has not been definitely determined. All who are interested in the subject will find this monograph useful and informative. A historical introduction is followed by a description of the three chief histological methods utilized (erythrosin-phosphormolybdic acid hæmatoxylin, erythrosin-thionin, picric acid erythrosin-light-green) and of the histological pictures thereby obtained.

The Negri corpuscles are found chiefly in the cornu Ammonis, and also in cerebellum and cerebrum more generally, in the medulla, and in the Gasserian and the spinal dorsal root ganglia. They consist of small homogeneous acidophil formations, usually rounded, lying in an acidophil matrix; the latter has commonly a definite contour, towards the periphery of which are situated the smaller bodies while the larger occupy the centre. Mainly, though not invariably, intracellular, they bear a close resemblance to certain forms of sporozoa; yet a complete analogy to the development-cycle of these organisms has never been demonstrated, nor are the authors of this monograph able to furnish such. The conclusion is reached that the Negri corpuscles of the cytoplasm are the derivative of structural changes in the nucleoli of the cells, the nuclear membrane being almost always defective. Reference is made to other alleged 'parasites', e.g., the Plimmer 'bodies' in carcinoma, which in all probability are likewise derived from cell nucleoli.

The monograph contains fine coloured and photographic plates and a good bibliography.

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THE NOMENCLATURE OF MINOR MENTAL DISORDERS.

By MILLAIS CULPIN, LONDON.

Few names in medical nomenclature are simply names. Some, like *measles*, *leprosy*, and *gout*, tell us nothing about the disease processes indicated, and their function could be performed as well by any other euphonic combination of letters: but most names of disease conditions carry further implications. A *cold*, for example, implies an etiology, and *acute infectious endocarditis* implies an anatomical localization, a pathology, and a qualification as to time. The simple names we may call indicative, the others descriptive.

As time passes, so our views on etiology and pathology develop or alter, and we find ourselves using descriptive names the meaning of which is now rejected. The descriptive significance of *malaria* or *rheumatism* is now obsolete: but such examples are not easy to find in general medicine. Perhaps one cannot attribute to the medicine of the schools the present use of the phrase 'bilious attack', no doubt of respectable ancestry, which occasionally obscures by its speculative pathology the symptoms of glaucoma, appendicitis, or arsenical poisoning: it is a descriptive phrase becoming obsolete in use and meaning.

In psychiatry the obsoletely descriptive names still used are in proportion more common: *lunacy*, *hysteria*, *melancholia*, and *hypochondria* no longer convey their inherent meaning—their pathology has become mythology, but no harm results. There is no striking incongruity, for example, in speaking of hysteria in men, and no one would, solely under etymological influence, prescribe cholagogues for

melancholia. But some terms, like 'bilious attack' in general medicine, still occupy a doubtful position: *neurosis* has a meaning beyond my grasp, though I once wrote of a 'neurosis of the leg'—I cannot tell why, and I give no man the reference, but I meant a hysterical paralysis with anaesthesia. If I may be pardoned a personal digression, I would explain that as a late comer to psychopathology I found myself involved in its problems before I had digested its nomenclature, and the digestion is still delayed almost unto rejection. In an endeavour to clarify my ideas I turned to the Oxford Dictionary, and found *neurosis* defined as "A functional derangement arising from disorders of the central nervous system, especially such as are unaccompanied by organic change in the structure of the body; a nervous disease". The first historical reference is to Cullen, who writes (1776-84): "I propose to comprehend under the title of neuroses, all those preternatural affections of sense or motion which are without pyrexia, as a part of the primary disease". Next Good writes (1822-34): "He considers it [lead colic] to be a neurosis". In 1874 Maudsley wrote of "families in which insanity, epilepsy, or some other neurosis exists". These quotations show that the usage of the word at present, elastic though it is, is narrower than formerly.

Neurosis is often used as a synonym for 'functional nervous disorder'—itself a clumsy phrase, for disorder involves function; we should be perplexed if we did not know the convention by which the aim of the phrase is to stress the absence of known disease. But why 'nervous'? What can we imagine about the nervous mechanism of, say, a hysterical fugue, that we cannot equally imagine about a manifested dislike for tomatoes or the actions of politicians? The three behaviours equally depend upon the functioning of the nervous system; if one can be described as 'nervous', then all can. It is interesting to find that Dr. Johnson, with the insight characteristic of some psychasthenics, wrote in a letter to Mrs. Thrale, in November, 1783, of "a tender, irritable, and, as it is not very properly called, a nervous constitution"; and Robert Burns, speaking of his own sufferings, said (January, 1788): "I am a good deal inclined to think that what are frequently called nervous affections are indeed diseases of the mind".

With a reservation which I will amplify later, functional nervous disorders are mental disorders. But let not the psychologist imagine that he knows more than the neurologist about the relation of mind and brain. When he talks of volition or conative tendencies or complexes he is only using abstract conceptions that facilitate description and discussion. He may explain what he indicates by them, and we may admit the need of postulating them, but they are used because we do not know enough to get closer to the problem: they are

scientific confessions of ignorance. On the other hand, to describe disturbance of volition in terms of even functional nerve disorder is often an unscientific assumption of knowledge.

Almost daily I pass a sad-looking man who bears a placard with the motto, "Nerves shattered by shell-shock". To him and the public this means some physical state, and the influence of this false pathology is fully perceived by those whose task it is to convey the truth to such war sufferers (words are lacking by which I can indicate concisely, in clinical language, what sufferers I mean, but the reader knows). To explain that a man's symptoms are not due to an injury of those things called nerves is met by retorts as, "Then you say there is nothing the matter with me?" or, "So you think I am off my head, do you?" Our own meaningless use of words with meanings has taught our patients to speak of their nerves with the same satisfaction with which our ancestors talked of rheums and humours, and with the same comfortable and unjustified feeling of knowledge. It must be admitted, however, that the practitioner who uses correct terminology will probably meet with misunderstanding on the part of the patient, and the incorrect use of words may be necessary to convey correct ideas. On the other hand, the education of the public in correct terminology may be expected to remove some of the stigma that attaches to mental disorders.

The source of greatest offence to accuracy of thought is *neurasthenia*. It has now become only a thought-saving device and covers any disturbance of mental processes that is not insanity or a glaring hysteria, as well as some disturbances of vegetative functions. The journalist who writes of a whole people suffering from 'post-war neurasthenia' only slightly enlarges our use of the word. Unfortunately it connotes a pathology—vague and indeterminate, but influential. Neurasthenia means weakness of nerves, and this organic weakness demands the hypothesis of an organic change of tissue. Time forbids that I should seek in the literature the causes of this organic change; but there come to my memory flat-foot, floating kidney, dilated stomach, intestinal toxæmia, pyorrhœa, drug habits, sexual excess, heredity, telegraphist's cramp, physical trauma, religious doubts, business worry, white bread, diphtheroid organisms, suppurative conditions, and most infectious diseases. A list of curative procedures and drugs would be as long.

We are generally tyrannized by words, and when we escape from this specific tyranny *neurasthenia* will take its place with 'bilious attack' among the obsoletely descriptives. But how escape from fresh tyranny? Dr. Rows has pointed out a principle in suggesting that we should cease trying to classify certain cases as epilepsy or hysteria, and be content to describe them as 'convulsive seizures'.

We must avoid diagnostic words that give a false sense of knowledge ; if words have an intrinsic meaning we must take care that the meaning and use of the word do not spread beyond the limits of knowledge, and in some circumstances we should choose words that convey as little information as possible.

What use, then, can we make of the nomenclature already at our service ? I shrink from the responsibility of suggesting any new words, and I do not think they are necessary.

Neurosis is perhaps useful, but I find it difficult to extract a meaning from the word, though it looks as if it meant something. We are learning about the endocrine glands in this connection, and are even threatened with *endocrinosis*, which I can imagine as becoming very popular and driving psycho-analysis off the newspaper stage when the insanity of a capital offender is in question. The endocrine glands have a relation to emotion on the one hand and to disturbance of the function of nerve tissue on the other : and it is here that we expect the co-operation between the neurologist and the psychopathologist that it is the function of this journal to foster. Without specifying an endocrine, an emotional, or a toxic factor as primary, we can regard it as proved that nerve action may be so deranged without demonstrable change of structure that vegetative and other functions are interfered with. I would limit *neurosis* to such a derangement of the intrinsic function of nerve tissue, of which the army 'disordered action of the heart' affords a good example—the rapid pulse, sweating, blue hands, and the fine tremors being all direct physiological results of deranged nervous control. To put a negative aspect, the symptoms have no direct relation to volitional control, unlike, say, a coarse hysterical tremor that can be imitated by anyone, for a time at least, and which has a more direct psychological meaning to the patient. In this tremor there is no interference with intrinsic nerve function ; one of the functions of motor nerves is to produce that spasticity of muscle that goes to make up the hysterical tremor. The tremor depends upon volition ; to call it a neurosis and maintain that a disorder of volition must be accompanied by a functional disorder of cortical cells is an intellectual exercise that does not intrigue me as a clinician, though when I turn to metaphysics I become interested in the abstract problem and am willing to discuss epiphenomenalism or psycho-physical parallelism with anyone who maintains such a neurosis theory.

In applying my definition there will be difficulties—in fact, I am fully aware of the danger of attempting a definition of any term in this subject—but some cases will be clear. A patient who suffers from a pure obsession without any somatic accompaniment does not provide us with the means of picturing any nerve, or system of nerve

tissue, the intrinsic function of which is deranged; if we say the cortical cells are at fault, then we skip the metaphysical problem, and may as well ascribe the difficulties of Irish politics also to a disorder of function of cortical cells. In our present state of knowledge such an assumption has neither scientific foundation nor pragmatic value. On the other hand, the physical signs in 'D.A.H.' indicate certain intrinsic nerve functions which are deranged, and which we may profitably study. I would not describe as a neurosis that hysterical vomiting which can be arrested by a stern command and the patient's deprivation of a basin, for the nervous mechanism of vomiting is working well; but a 'nervous dyspepsia', with alterations in gastric secretion and motility, can be studied as a change in intrinsic nerve function. *Neurosis*, then, indicates a type of tissue reaction; it is useless as indicating the type of patient when we wish to consider minor mental disorders. Looking at the history of the word, we see its present use was the result of that nineteenth-century belief that science would soon solve the relation of mind and brain; our continued use of it is a pretence that the problem is solved, and if it is to be retained in our nomenclature we must give it a narrower meaning that will justify the retention.

What of *psycho-neurosis*? To most people it means something that is not a psychosis, and it need not mean a neurosis; so that it becomes etymologically akin to 'black-beetle'—a word not used by the educated, since the creature thus named is neither black nor a beetle. I can offer you no alternative word like 'cockroach', which, in spite of its appearance, does not connote any relation to fowl or fish. As a matter of fact, there is no etymological reason why *psychosis* should not be applied to our cases; it is usually applied to insanity, but some authorities have applied it to the minor disturbances (Dr. Henry Head uses 'functional psychosis' as an alternative to 'shell shock' in *Medical Problems of Flying*, page 219), and there seems no good reason why we should not speak of *minor psychoses* when we wish to indicate what have been called 'functional nervous disorders'. The phrase indicates only that mental processes are disturbed, and need not convey any view as to whether the disturbance has any possible anatomical foundation.

The group name being disposed of, we may now consider the chief reaction types that come within the group, remembering that we are not dealing with 'clinical entities'—a conception dear to those who kiss the rod of verbal tyranny—but with patients, whose symptoms will not always fit nicely into the most perfect scheme. Any classification must be loose; but this looseness is necessary and inherent to the subject, and may not be entirely removable by any advance of knowledge.

Under the heading "Conditions found in the minor psychoses" I find it convenient to speak of:—

1. *Hysteria*—a name which is now non-descriptive, and objectionable only on account of its condemnatory nuance. I use it to indicate disturbances due to altered volition, and also a particular temperament of the patient; that is, both for a symptom and a condition. Whoever is not satisfied with this use can surely find in the literature a definition to suit himself. *Conversion hysteria* is proper if used in its original sense.

2. *Anxiety states*—a term that may be applied to cases characterized chiefly or entirely by anxiety. This avoids Freud's crystallization of anxiety neurosis and anxiety hysteria, though the terms are proper if used in his sense. It is unfortunate that the law of priority in scientific nomenclature should not be applied here; if it were, we should be spared the use of anxiety hysteria, Freud's phrase to denote a condition arising from the sexual impulse, by people who do not accept that psychopathology and who lead to confusion when they use the phrase. It would be proper for them to speak of *anxiety with hysteria*. *Anxiety neurosis* is similarly misused; Freud coined the phrase and applied it to a condition which he believes to be of toxic origin, and his use of 'neurosis' is not inconsistent with my attempted definition.

3. *Obsessional states*—which stand remote from hysteria—are also often associated with anxiety. The customary phrase *obsessional neurosis* is mytho-pathological.

4. *Hypochondria*—which is sometimes, I believe, a part of an obsessional state, but there may be a type for which the word is useful; the discredit attached to the implied pathology renders it harmless.

5. *Psychasthenia*—which I am loth to part with, for I have fallen under its tyranny, and find that Janet's conception still helps me to sum up mentally certain conditions; but the nomenclature of the Royal Colleges makes it a synonym for obsessional insanity, and the separation from it of the anxiety and obsessional states leaves little but a residue of doubters and over-scrupulous ones who merge into the normal.

6. Last and least, *Neurasthenia*. I once made a classification of 415 cases,¹ and 5 of them I called neurasthenia. Dr. Ernest Jones,² classifying on a different basis, arrives at 1 per cent of neurasthenia, and the nearness of the proportions is not a coincidence. There are uncommon cases, characterized by feelings of misery with neurotic symptoms and a loss of volition, that do not fall into any of the types mentioned above, and they appear to conform to early descriptions of neurasthenia. I have no other word to indicate them,

but regret that the present rigidity of our language will not allow the use of *neurastheny* in the vulgar tongue, leaving *neurasthenia* for these rare cases, just as *melancholy* has taken on the broader sense and left *melancholia* to psychiatry. In the absence of such a distinction we must use some qualification to show we are not using the word in its general and deplorably evasive sense: I would suggest that some phrase such as *specific* or *actual neurasthenia* should be used; *essential neurasthenia* would be suitable, but the law of priority intervenes, as it has already been used by Charcot in another sense.

This discussion on words will not, I hope, be regarded as abstract. Such a word as *neurasthenia* is as powerful as it is pernicious. I recall an unfortunate patient whose depression, insomnia, and inability to work led to that pseudo-diagnosis, which in turn led to two months' 'Weir Mitchell treatment', when she was shut up alone, with no friends, no books, and no recreation, filled with most distressing obsessional thoughts which her physician had failed to elicit. Like many obsessional patients, she was shrewd and intelligent: as she progressed towards recovery under other treatment, her frank criticism of 'nerves' satisfied me that patients who are worth treatment do not need the euphemism of 'nerve exhaustion' or 'neurasthenia' to cover a minor mental disorder. In other cases such phrases have been a real hindrance to treatment. On our side, by using words implying a pathology which may be, and probably is, false, we hinder a healthy confession of our ignorance or an acknowledgement of the difficulty of the subject.

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THE PHYSIOLOGY OF STEPPING.*

By T. GRAHAM BROWN, CARDIFF.

I.—THE PRODUCTION OF RHYTHM.

THE writer¹ has shown that the rhythmic alternation of movement in such acts as stepping is not produced by the action of rhythmically-timed stimuli evoked in the moving limbs themselves. The rhythm is essentially produced in the nervous centres. He also showed that rhythmic movements may occur when two *continuous* movements (flexion and extension) antagonize one another. It would appear that the rhythm arises under the physiological 'interference' of the two arrhythmic activities. *The essential condition of stepping is the production of two antagonistic activities (flexion and extension) of continuous type and of more or less equal intensities in the spinal centres.*

Other workers have accepted this view. They have, however, translated it to mean that the rhythm arises under equality of the excitation and inhibition evoked in each group of motor neurones. But the inhibition and excitation given by the same stimulus are not equal; and the inhibition given by extension-producing stimuli is less nearly equal to the excitation than is the inhibition given by flexion-producing stimuli to the excitation given by them.

Exact equality may, of course, occur between the excitation given by one stimulus and the inhibition given by another in *one* group of motor neurones (e.g., flexor), provided the different intensities of the two stimuli are appropriate. But there will then be *inequality* of excitation and inhibition (from antagonistic stimuli) acting upon the *other* group of motor neurones. (This follows algebraically from the fact of inhibition being less than the excitation given by at least one of the two stimuli.) In other words, when exact equality occurs between the excitation and inhibition playing upon one group of neurones (e.g., flexor), the inhibition must be less than the excitation playing upon the other (e.g., extensor), and that other group must have a discharge greater than normal. Therefore the two antagonistic groups of motor neurones cannot discharge rhythmically at one and the same time if *exact* equality between the inhibition and excitation playing upon either is the condition of its

* From the Physiology Institute, Cardiff.

rhythm. Or, if the condition is merely a close approximation to equality, the rhythmic discharge will be best marked in that muscle the motor neurones of which are most equally acted upon by excitation and inhibition.

Simultaneous rhythmic movement in *two* antagonistic muscles is, however, one of the chief features of stepping (and so on): and I have found that if the excitation and inhibition are nearly equal in one group of motor neurones, the rhythm is best marked in the *other* muscle. Therefore, the condition of rhythmic discharge is not equality between the inhibition and excitation playing upon each group of motor neurones.

We are thus faced with the question, What is the condition of the rhythmic discharge in such coarse rhythms as stepping?

If the excitation which plays upon a group of motor neurones is greater than a simultaneous inhibition which acts upon it, there will be an overplus of excitation after the inhibition has had its reducing effect. This may be termed the 'resultant excitation', and the discharge which is thereby conditioned may be termed the 'resultant discharge'. This state occurs, of course, in compound reflexes. For instance, if strong flexion is antagonized by moderate extension, there is a resultant discharge in the group of flexor motor neurones: for the flexion-reflex wins although it may be reduced in the combat.

We obtain an 'intensity series' of *compound* reactions if we take 'simple' extensions of constant intensity and antagonize them with different intensities of simple flexion. Suppose that the series starts at the extreme of minimal flexion: there is then resultant discharge in the extensor group of neurones during the compound reflex, and none in the flexor. As the intensity of simple flexion is raised in succeeding reactions, the extensor resultant discharge falls (because the inhibition factor rises): then a resultant discharge appears in the flexor group of motor neurones, at a certain intensity of 'simple' flexion, and goes on increasing with further increase in the intensity of flexion.

Therefore one resultant discharge (extensor) progressively falls from a high value to zero, and the other (flexor) begins to rise from zero before the former has fallen absolutely to zero (for there is simultaneous discharge of the two groups in the middle of the series). There must be an intermediate point at which the two resultant discharges are equal. (I measure resultant discharge—flexor or extensor—as the ratio of compound muscle contraction to the contraction in the maximal simple flexion- or extension-reflex.)

My results indicate that it is at this point (and round about it) that rhythmic discharges occur. The essential condition of rhythmic

discharge (stepping, and so on) is approximate equality between the *resultant* discharges of two antagonistic groups of motor neurones. The rhythmic movements are of greatest magnitude and most 'complete' in type where the two resultant discharges are of the greatest intensity whilst remaining equal. It looks almost as if the two antagonistic groups of motor neurones (e.g., flexor and extensor) may perhaps 'interfere' with one another to give the rhythmic discharge in both. But the conditions of any such interaction can at present only be surmised.

II.—THE CONDITIONS OF BILATERAL AND UNILATERAL STEPPING.

Sherrington's² theory of the mechanism of stepping and hopping at present holds the field. But it is founded on the assumption that the excitation and inhibition given by the same stimulus are equal. As this is not so, the theory must be reconsidered.

He starts by making the observations that a strong flexion can completely knock out a maximal extension, but that a weak extension knocks out a weak flexion. He measures the intensities of the reflexes by the electric strengths of the stimuli used, and he comes to the conclusion that the intensity gradient of the extension-reflex is less steep than that of the flexion-reflex to electrical stimuli of the same values. This conclusion is not drawn directly from observation of the actual intensity series of reflexes, but from the observations described above: and it is also reinforced by the assumptions that the electric stimulus is a true measure of the reflex it evokes and that the inhibition and excitation given by a stimulus are equal.

I have directly measured the intensity series of the two reflexes, and it appears that the exact opposite takes place in good preparations of the 'decerebrate' cat (cat with the brain removed from above the level of the anterior colliculi).

Stimulation of one and the same afferent nerve in a limb gives flexion in the same limb and extension in the crossed limb of the pair. If the stimuli are progressively increased in intensity from threshold up, the crossed extension rises at a steeper gradient than the same-sided flexion. It attains its maximum while the same-sided flexion is still moderate, or even weak. Further increase in the intensity of stimulation gives further increase in the intensity of flexion while the extension merely remains maximal (or perhaps actually diminishes a little).

The results from which Sherrington assumed the lesser gradient of the extension-reflex were obtained by the application of equal intensities of stimuli in ascending series to two antagonistic afferent nerves

(right and left). He thus compounded flexion and extension in either limb. After the first few stimuli he was probably compounding maximal extension with sub-maximal degrees of flexion in both limbs. If this was the case, it is easy to see that the increasing flexions against constant extensions gave ever greater flexor contraction and extensor relaxation (resultant flexion) in both limbs. The inhibition given by the constant extension would then appear to be *relatively* smaller with each increase in intensity of the flexion against which it acted. This was the fact from which the lesser gradient of extension was assumed: it is more easily explained as due to the observed steeper gradient of extension.

My view of the matter is strongly supported by the measurement of the intensity of extension which (when antagonized by flexion) gives the best stepping. I find that the extension-reflex is then usually maximal (or nearly so). Sherrington's statement is that the extension stimulus should be mild or moderate. But he measures the extension stimulus by the intensity of the same-sided flexion reflex which is also evoked by it: and I have shown that a 'weak' stimulus* gives a maximal extension reflex (because of the greater intensity gradient of extension). Therefore the two observations do not clash.

The fact that stepping is obtained where the extension is maximal gives opportunity of a satisfactory explanation of the variations of rhythmic limb movement—galloping, trotting, and stepping in both limbs of a pair at the same time, and in one limb alone while the other is held flexed, and so on.

Maximal extension is induced in the crossed limb (e.g., Left) at every intensity over a very wide range of flexion induced in the same-sided limb (R). That maximal extension (L) may be antagonized by any of a wide range of intensities of flexion in its own limb (L), and each of these flexions is accompanied by maximal extension in the first limb (R). Thus *any* combination of flexion (within that wide range) with maximal extension in one limb may be accompanied by the same or any other combination of flexion and maximal extension in the other.

The form of the rhythmic movements depends upon the degree of approximation to equality of the resultant discharges in the antagonistic groups of motor neurones (flexor and extensor) in the same limb. Thus it is possible (on my theory) for any form of rhythmic movement (with certain reservations) in one limb to be accompanied by the same or any other form in the other limb. The theory also shows how the stepping may occur in one limb alone

* That is, a stimulus which is 'weak' in its same-sided flexion effect.

while the other is flexed (hopping and the scratch-reflex), or while it is extended (unilateral scraping, as seen in a dog at a rabbit's burrow). The first of these extremes occurs where the same-sided flexion is intense enough to overcome the extension in its own limb, and gives a maximal extension which is antagonized by moderate flexion in the other: and the second occurs where the same-sided flexion is weak enough to be overcome by the maximal extension in its own limb, but yet gives a maximal extension which antagonizes a moderate flexion in the opposite limb.

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STUDIES FROM THE PATHOLOGICAL LABORATORY. BETHLEM ROYAL HOSPITAL.

BRIEF EXPLANATORY NOTE.

BY J. G. PORTER PHILLIPS, LONDON.

FOR the benefit of some readers it has been thought advisable to preface the following researches by an explanatory note.

In the first instance the investigators engaged were prompted to prosecute inquiries into certain physiological phenomena occurring in varied mental states, by the fact that certain modification and amelioration of signs and symptoms were noticed to occur when treatment of an empirical nature was employed. These clinical observations have been made by me and others over a period of many years, and their real nature demanded a scientific explanation.

It is pleasing to note that each of the three investigations entered upon has been approached with a totally unbiased mind, and without any object in view of satisfying the demands of either the psychical or physiological school, as to the genesis of the various mental states dealt with.

The results are intended to record exact findings—as facts to correlate with others—with the hope that sooner or later certain definite postulates can be laid down and concepts formed as to the pathological mechanisms entailed.

I.—THE PHYSICAL FACTOR IN MENTAL DISORDERS.

BY H. S. LE MARQUAND, LONDON.

Just as the development of a bacterial infection depends on the relation between the virulence of the invading organism and the resistance of the host, so, many forms of mental disorder appear to depend on the relation between the severity of the psychic disturbance and the mental stability of the patient. The following article is the account of an investigation of a number of patients, with a view to the discovery of some fresh factor in the production of the psychoses. The amount of complement in the blood, the

degree of alkalinity, and the surface-tension of the serum were determined in each case.

The Complement in the Psychoses.—The patients can be roughly placed in the following classes of insanity:—

Cases.				Cases.			
Manic-depressive psychosis	..	6		Dementia præcox	..	..	19
Dementia paranoides and para-				Psychoneurosis	..	..	8
phrenia	..	..	14	General paralysis	..	..	5
Melancholia	..	..	18	Various	..	..	20
Confusional insanity	..	..	7				—
Paranoia	..	..	3	Total	..	..	114
Dementia	..	..	4				—
Mania	..	..	10				

The amount of complement was determined in the following way. The blood of the patient, obtained from the median basilic vein, was centrifuged, and the serum diluted to 1 part in 10 with 0·9 per cent NaCl. In each case a hæmolytic system was put up with six different dilutions of serum. The tube with the highest dilution of serum contained 1·5 per cent of serum or 3 parts of the 1–10 solution, and the tubes varied by 0·5 per cent up to 4 per cent of serum in the tube with the lowest dilution. The same amount of sensitized blood-corpuscles (5 per cent suspension) was added to each tube, and the volume equalized with 0·9 per cent NaCl. Thus the sensitized blood-corpuscles consisted of 0·5 per cent of hæmolytic serum of a titre of 1–3000 in 5 per cent suspension of sheep's red cells in normal saline. After an hour in a water-bath at 37° C., the degree of hæmolysis was noted, that is, the amount of complement was determined. The tubes were classified under the headings 'no hæmolysis', 'slight hæmolysis', 'extensive hæmolysis', and 'complete hæmolysis'. No tube was counted under the last heading if a trace of red corpuscles remained un hæmolyzed.

The quantity of complement in normal blood was estimated in 1909 by MM. Jacobæus and Bachman.¹ Using the same method, they found that complete hæmolysis was obtained in the great majority of normal people with dilutions of serum representing 0·8 to 2 per cent. Our series of normals was taken from the nurses and attendants of the hospital, and we did not obtain hæmolysis in such low dilutions. In a few cases hæmolysis was complete with 1·5 per cent of serum, but the majority did not hæmolyze completely with 2 per cent of serum. Compared with the results of M. Jacobæus the amount of complement appeared low.

We found that the amount of complement in the 114 cases of mental disease varied very considerably, but practically within the limits of normality. On examining the results of each of the above groups there is found no very marked difference between them,

except that the dementia paranoides and paraphrenia cases show a rather high amount of complement. In the group of 18 melancholies there is a great variation, some hæmolyzing in very high dilutions, others scarcely at all in low dilutions.

To determine whether the complement varied with the physical or mental condition of the patient, and to ascertain if it were a constant factor for each individual, a number of these patients were examined on two or more occasions. Of 33 cases examined more than once, 13 were in very much the same condition both mentally and physically on each occasion. Of these 13, 9 showed the same or almost the same degree of hæmolysis, 3 showed less, and 1 rather more extensive hæmolysis on the second occasion. In only 2 of the 4 cases which did change was the change pronounced. In 20 cases there was a considerable change in the mental and physical states. Of these, 6 showed the same degree of hæmolysis, in 5 there was more extensive hæmolysis, and in 9 the hæmolysis was less pronounced. Therefore it may be deduced that for a given individual the complement tends to remain constant in quantity, unless there takes place a very pronounced change in his condition.

Analyzing these cases still further, we find that in 6 of them marked physical and mental deterioration had taken place. Of these cases, 1 remained the same, 2 hæmolyzed more, and 3 less than before. In 8 cases mental and physical improvement had taken place: of these, 4 remained the same, 3 hæmolyzed less, and 1 more than before. A deterioration, then, leads to a more marked change in the complement than an improvement in condition.

But though the change in the amount of complement is apparently altered by the physical and mental changes of the patient, yet the absolute amount of the complement does not depend on the physical condition. For example, in 17 cases of the series picked out for their bad physical condition (and bad mental cases also, as it happens), in 9 the complement was on the high side, in 5 on the low. Or, if we take the cases with a low hæmolysis, we find that of 22, 15 were in good, 4 in poor, and 3 in fair physical condition: while of 47 cases with a high hæmolysis, 32 were in good, 8 in poor, and 7 in fair condition.

In some cases of marked physical wasting, the complement remained high all through. It may be mentioned that in one case of general paralysis the amount of complement was largely increased during a seizure.

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II.—THE ACID-BASE EQUILIBRIUM IN CASES OF MENTAL DISORDER.

By C. J. THOMAS, LONDON.

The object of the following part of the investigations was to discover what pathological basis, if any, could be found to account for the bodily and mental improvement of some cases of mental disorder under alkaline therapy recorded by various clinicians.

J. J. M. Shaw¹ considers a 'hypo-alkaline state of the blood', due to the production of acid substances from excessive nucleoprotein breakdown, as a contributing factor in the causation of the convulsive seizures of epilepsy, and reports several cases greatly improved by the administration of alkalis, though he claims only temporary amelioration.

Guidi² concluded, from estimations of the ammonia excretion of the urine of epileptic patients, that acid intoxication was an important feature of epilepsy, as the amount of ammonia excreted is greatly increased before a fit. He assumes that the amount of ammonia eliminated corresponds to the degree of acid intoxication.

B. H. Shaw³ states that many fresh admissions are in a state of acidosis, especially in cases of acute delirium, melancholia, confusional and stuporose states, and epilepsy. He also considers that acidosis may be a factor in the production of epileptic fits. His views are based among other points on the discovery in these cases of acetone bodies in the urine, and on the time incidence of epileptic fits varying with the diurnal changes in the hydrogen-ion concentration of the blood. He gives examples of cases which improved under alkaline therapy, and states that in cases which recovered it was noteworthy that the improvement synchronized with diminished acidosis.

Walker,⁴ in his observations on the urea concentration in the psychoses, notes that all the cases of dementia præcox in his series showed a moderate to a marked degree of acidosis, the statement being based on the ammonia excretion of the urine. Acidosis was not found by him in mania, melancholia, or insanity with epilepsy, but to a mild degree in eight cases of confusional states. A severe acidosis was also recorded in his only case of general paralysis. If there is an acidosis present, as some of these observers believe, we have at once a pathological condition present pre-eminently responding, for the time being at any rate, to alkalis.

The acidosis need not necessarily be a ketosis, though even here we were unable to confirm the frequent acetomuria met with by Shaw in admission cases. The degree of acidosis in any particular case may be estimated in several distinct ways. Clinically the measurement of the actual hydrogen-ion concentration of the blood is useless, the

neutrality of the blood being so elaborately guarded, as any considerable increase of hydrogen concentration is incompatible with life. Estimation of the alveolar CO_2 (which gives us a measure of the available sodium bicarbonate) in mental subjects presents difficulties so insuperable that this method of investigation was discarded. Van Slyke's definition of acidosis as "a condition in which the concentration of bicarbonate in the blood is reduced below the normal level", although not universally applicable, is of great practical importance. The deficiency of bicarbonate gives a measure of the ability of the blood plasma to hold the hydrogen-ion concentration of the blood constant when foreign acids are being introduced. We therefore took the blood specimens of 100 to 120 cases at random, but excluding cases of insanity with epilepsy (which we are investigating separately), and determined the CO_2 combining power by van Slyke's method. The whole blood was used in each case, and was brought into equilibrium with alveolar air for the experiment. A drop of secondary octyl alcohol was introduced into the apparatus for each experiment, to prevent frothing of the blood. The CO_2 combining power varies considerably, but in normal people has been found to be constant within the limits 55 to 75 per cent. The average of our series was 62.27, which would appear to be well within the normal limits decided by other workers.

The four cases which were below the level of 55 per cent were not considerably below, the lowest being 47 per cent. One of these cases was dementia præcox, two were toxic confusional states (puerperal), and the remaining one was a senile melancholic, very resistive and spoon-fed. The general appearance of these patients was suggestive of a severe toxæmia. All were sallow and unhealthy in complexion, one having marked pyorrhœa. It is interesting to note that the van Slyke readings of one puerperal case, taken at different times in the course of her progress towards recovery, were 48.39, 52.98, 58.45, 66.98. This patient on admission was childish and fatuous, but steadily improved until she was discharged quite recovered. With the increase in the bicarbonate figure her toxic appearance gradually disappeared. At no time during her illness could acetonuria be detected.

An analysis of 18 cases with alkali reserves which, although not abnormal, were less than 60, showed:—

Cases				Cases			
Dementia præcox	..	..	6	Melancholia	..	..	3
Dementia paranoides	..	..	6	Manic-depressive insanity	..	..	2
G.P.I. (advanced)	..	..	2	Hysteria	..	..	1
Toxic confusional—				Paranoia	..	..	1
Alcohol and drugs	..	..	1	Confusional, with gross cardiac			
Puerperal	..	..	1	disease	..	..	1

The hamatoeritic indices of the blood of these cases were determined and found to be normal. The second method of investigation employed was 'the alkali tolerance test' (Sellards). Briefly put, it consists in ascertaining the amount of sodium bicarbonate that must be taken by the mouth in order to make the urine alkaline. In a normal person 5 gm. will usually effect this alteration, 10 gm. being the outside limit for a man. Sellards states that a deficit of 20 gm. of sodium bicarbonate produces a degree of acidosis only demonstrable by examination of the blood.

The actual procedure was as follows: The hydrogen-ion concentration of a specimen of urine passed before the commencement of the experiment was first estimated colorimetrically. To 5 c.c. of the filtered urine was added a definite quantity of an appropriate indicator. The p_H of the urine being usually between 5 and 6, methyl-red or brom-eresol-purple was commonly used. A series of solutions of known p_H were accurately prepared according to the tables given by Cole: 5 c.c. of each solution of known p_H were placed in similar tubes to the urine, and the same amount of indicator added to each. The tints were now compared in a comparator, and the p_H of the urine was thus ascertained. The patient's bladder was emptied and sodium bicarbonate given in 2-gm. doses in a definite quantity of water. At the expiration of each half-hour the p_H of the urine was determined, until at last the p_H of the urine was the same as that of the blood, i.e. 7.4, using brom-thymol-blue, phenol-red, or eresol-red as indicator in the latter stages. If the urine was obviously keeping acid, larger quantities than 2 gm. were administered at a time. The patient's weight was also taken, as the amount of bicarbonate required varies proportionately with the weight of the body fluids. The majority of patients responded to this test as normal individuals. Too frequently to be a coincidence, it was observed that the alkali tolerance of tube-fed patients was increased. In our series, one patient with nephritis, whose alkali reserve was 65.7, had a markedly increased alkali tolerance, while the urine in the confusional case (with heart disease) was decidedly acid after the administration of 14 gm. With the exception of these cases of gross bodily disease, we found it not uncommon to detect deficiencies of 14 or 16 gm., while even 18 and 20 gm. were recorded. A typical uncomplicated case gave results as follows:—

Before experiment	..	2	4	6	8	10 gm. NaHCO
p_H urine	..	5.0	5.8	6.8	7.3	7.7 7.9

showing 6 gm. to be the approximate alkali tolerance.

The most marked increases in the alkali tolerance were found in cases of dementia præcox and in toxic confusional states (especially puerperal cases). Thus a young girl with dementia præcox, weighing

just 70 lb., needed 16 gm. to make the p_H of her urine 7.5, while in another case the administration of 16 gm. only caused the p_H of the urine to rise to 7.05. A puerperal case with an alkali reserve of 52.9 required 14 gm., and a toxic-looking stuporose case required 16 gm. Of the first 50 cases we examined, 8 had a tolerance above 14 gm., 3 of which were due to obvious bodily disease, 3 were toxic confusional states, and 2 dementia præcox. A slight increase in bicarbonate tolerance (10 to 14 gm. required) was found in 7 depressed cases.

Our results show therefore that in the great majority of cases of mental disorder there is no acidosis whatever, but that a small group exists in which a slight degree of acidosis can be detected. This group responds very well to alkaline therapy, the dosage of which can be regulated easily by simple tests on the urine. In a few cases the immediate response to alkalis is very striking, but is not sustained. This is usually due to the coincident toxæmia, appropriate treatment for which should be used energetically. Thus, in a case of puerperal insanity, treated in consultation with Dr. S. R. Tattersall, immediate bodily and mental improvement was noticed, the excited, incoherent state on admission giving place to a quiet and semi-rational condition. On discontinuing the alkali the excited condition recurred, being readily recontrolled by repetition of the treatment. In spite of energetic measures for the elimination of toxins, the patient succumbed. Post-mortem examination showed that while the uterine cavity appeared healthy, the liver revealed multiple small areas of necrosis with hæmorrhages, indicating the severity of the accompanying toxæmia.

The cause of the acidosis undoubtedly varies: in melancholies it is possibly due to intestinal fermentation, in dementia præcox probably due to some error of metabolism, while in one of our cases it was certainly due to prolonged diarrhœa.

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III.—SURFACE TENSION OF SERUM IN THE PSYCHOSES.

By C. LOVELL, LONDON.

Surface tension (S.T.) can be measured by the static or by the dynamic method. The static method has the advantage over the dynamic, in that it represents more closely the condition of the fluids

in the tissues. The S.T. of serum will be determined by a number of tension-reducing substances, and a number of tension-raising substances. All sera can be divided into eight groups, according to whether there is an excess or a deficiency of tension-lowering or of tension-raising substances: and whether these substances are toxic or non-toxic. At present we have to deal, practically, with four groups.

At the concave surface of the meniscus in a capillary tube, the surface film tends to diminish its total surface energy: the concentration of tension-lowering substances will increase in the film, and the concentration of tension-raising substances will decrease in the film. Hence we shall be measuring the excess or deficiency of toxic or non-toxic tension-reducing bodies. Immediately a capillary tube is set up in serum, the S.T.-reducing bodies begin to accumulate at the surface, and there is a steady decline of the meniscus. But after three hours the rate of decline is so slow that no change can be noticed in a quarter of an hour. Readings now taken will give a comparative estimate of S.T.-reducing bodies present.

An additional advantage of reading after three hours is that small differences of viscosity do not affect the result. We took as our standard a capillary tube of diameter 0.075 cm., which reduces the instrumental error to a minimum.

In the course of examining over three thousand cases, one has been much impressed by the small variation which exists in the S.T. value. It is not comparable, however, with the constancy of the H-ion concentration. The average S.T. value in a large number of normal individuals, mostly medical and engineering students, is 41.5 dynes per cm. There is a daily variation, the value being low in the evening. It can be altered slightly by diet, and more markedly by violent exercise. In places like University College Hall, where a number of normal individuals can be observed, a marked difference is noticeable between the mental activity of the students in the morning, when the S.T. is high, and in the evening, when it is low. Breakfast is a silent meal, dinner is the opposite. A low S.T., possibly the result of moderate fatigue, is associated with increased mental activity.

Preliminary animal experiments supported this theory. Animals in which the S.T. was raised by establishing a condition of hydreemic plethora all showed accumulation of fat, together with emphysema and various other changes.

At that time it was not possible to lower the S.T. of animals experimentally without killing the animal. Some non-toxic substances which lower the S.T. of water do not lower the S.T. of serum.

When we tested the theory on patients liable to convulsions, the results were not conclusive. For example:—

Mr. B. was a melancholic general paretic: his S.T. was 39.5 dynes. During a generalized fit it fell to 34 dynes. Two days later it was 36.5 dynes, and four days later it was 39.5 again.

Mr. S. was a chronic maniac: his S.T. was 33 dynes continuously. We know that the S.T. can be reduced by violent exercise, so the question arose as to whether the low S.T. caused the fit in the general paretic or whether the fit caused the low S.T.

Miss S. was an epileptic: after a fit her S.T. was 41.5 dynes. Later, she became hysterical and maniacal, and her S.T. then fell to 35.5 dynes.

Recently Dr. Farran Ridge, of Darent, has supplied me with blood from patients subject to frequent and severe convulsions. Their S.Ts. are within normal limits.

Mr. S. was a case of acute mania. He was restless day and night: his S.T. was 42 dynes. While taking amylene hydrate he became quieter, and his S.T. was 48 dynes. When the drug was stopped he became restless again: S.T. 45 dynes. Again taking amylene hydrate he was quiet, and his S.T. was 49 dynes.

Now some students, by taking no food or drink all day, and spending the afternoon running over Hampstead Heath, reduced their S.Ts. to a minimum of 33 dynes. Therefore a low S.T. (*per se*) is not a cause of convulsions.

All forms of convulsion do not cause a low S.T. So far, nearly all convulsions in general paretics have been associated with a low S.T., as also have some forms of maniacal excitement. There are some cases, physically quiet, perhaps lying still in bed all day, who are mentally very active, talking incessantly day and night. Some of these cases have been examined: the S.T. ranges about 39 or 40, quite within normal limits.

The melancholies mostly had a high S.T., 44 or 45 dynes being the average. Some of the agitated melancholies, however, were lower.

Acute confusional cases are high: they become higher if they pass into stupor, and lower as they improve.

In general, cases of dementia præcox show no abnormality. But some cases diagnosed as dementia præcox have a high S.T. while they are resistive and inert, and as they return to normal the S.T. falls. Probably these latter are cases of acute confusional insanity in the stuporose stage.

When the serum of a normal individual is heated, the S.T., as indicated by the statical method, rises. The average range is 4 dynes, but may be as much as 8 dynes.

In our series of 114 cases, in only 5 cases was the range increased. These were :

Cases				Cases			
Melancholia	..	..	.. 1	Dementia praecox	..	..	.. 1
Manic-depressive insanity	..	..	.. 1	Dementia	..	..	.. 1
Paranoia	..	..	.. 1				

Thirty-nine patients showed a range, on heating, which was either very low or even reversed; that is, the S.T. was lower after heating. These were :

Cases				Cases			
Dementia paranoides	..	..	.. 5	General paralysis	..	..	.. 1
Dementia praecox	..	..	.. 6	Paranoia	..	..	.. 1
Melancholia	..	..	.. 6	Mania	..	..	.. 2
Psychasthenia	..	..	.. 8	Epilepsy	..	..	.. 2
Confusional insanity	..	..	.. 4	Various	..	..	.. 3
Manic-depressive insanity	..	..	.. 1				

If we take normal serum and divide it into two parts, and heat one part to 56° C. for half an hour and then cool it, and put equal quantities of the two specimens into collodion sacs and dialyse against distilled water, there is a great difference in the behaviour of the two specimens. In general the unheated specimen takes up water and loses little salt, whereas the heated specimen takes up little water but loses much salt. If we repeat this experiment, using a serum of which the S.T. variation on heating is small, the two specimens behave nearly or quite alike on dialysis. Thus there appears to be a difference in the union of the electrolytes and proteins in the two cases.

SUMMARY.

To compare the results of the complement and S.T. experiment, we may take 38 cases which had a range of S.T. on heating much below normal. This was associated with a low amount of complement in 23 cases, a high amount in 8, and 7 were in between. Cases with a high range of S.T. were too few for a comparison to be of value.

Of 28 cases examined more than once, it was found that where the range of S.T. was increased, the complement remained unaltered or was increased, never diminished.

Where the range of S.T. was unaltered, the complement remained unchanged in all but 3 cases of 11, where it was diminished.

A reduction of the range of S.T. in 9 cases was associated with no change of complement in 3, with a decrease in 4, and with an increase in 2 cases.

In general the complement varies with the range of S.T., increasing in amount as the range of S.T. increases, decreasing as it decreases, but always tending to remain a more constant factor.

The range of S.T. was always small in the psychasthenics.

The S.T. reading of unheated serum shows little variation in widely differing diseases.

In mental disease, dementia præcox shows no abnormality, but stuporose confusional cases show a high S.T.

Generally, cases with a low range of S.T. have also a low complementary power, and the combination of their electrolytes and protein in the serum differ from the normal.

THE PHOBIA AS THE FUNDAMENTAL FACTOR IN THE PSYCHONEUROSIS.

By T. H. THOMAS, BRISTOL.

FREUD has said in his *Introduction to Psycho-analysis*,¹ "The structure of psycho-analysis that we have erected is really only a superstructure, which, at some future time, must be placed upon its organic foundation".

The view here maintained is that in every psychoneurosis there is one feature that can be considered in physiological terms and can be definitely stated to arise as the result of physiological processes. That feature is the phobia.

Freud has emphasized the importance of an inherited special constitution for the future development of the neurosis, but he has not definitely postulated the organic nature of this constitution. His modification of his original view that the main causative factor in the psychoneurosis was infantile psychic trauma, and his replacement of this by the view that the actual outbreak of the neurosis was occasioned by later-formed phantasies² of infantile traumatic experiences, would appear to be somewhat at variance with any clearly-defined hypothesis as to the organic origin of the neurosis. The existence of a phantasy implies the pre-existence of a condition of mental stress, for which the phantasy is merely a psychic compensation. When the phantasy is called for as a release mechanism, the neurosis has already started. The factors which have given rise to the mental stress are the only factors which can have any fundamental value.

Jung has described Freud's analytic conception of the neurosis as 'one-sided',³ and has drawn attention to the importance of a present mental conflict for the onset of neurotic symptoms. Were he less of an animist one would feel that his 'constructive' viewpoint would be of great assistance in the development of a final understanding of the neurosis. The crux of the Freudian theory is seen to be that repressed mental material exists in the unconscious, and that unconscious mental processes are typically conative in kind, and may be described as *wishes*.⁴

E. B. Holt says in the *Freudian Wish*, "The wish transforms the principal doctrines of psychology and recasts the science; much as the atomic theory and later the ionic theory have reshaped earlier

conceptions of chemistry".⁵ He brings the wish-theory into line with behaviouristic psychology by defining behaviour in terms of specific response⁶ to environment, a release phenomenon occurring in the reacting organism in response to external factors. This definition suggests that a condition of internal stress is set up in the reacting organism, a *motor set*,⁷ which, when touched off, results in the re-establishment of physiological equilibrium.

The specific response as conceived by Holt is identical with the Freudian wish. According to Holt, behaviour is not necessarily a function of the immediate stimulus, except in the lowest stages of development.⁸ As behaviour evolves, any correlation between it and the stimuli immediately affecting the organism becomes increasingly remote. The immediate stimulus recedes in importance owing to the integration of reflexes.

Sherrington points out that even the simplest reflexes are purposive, and states that "the fact that a reflex action should exhibit purpose is no longer considered evidence that a psychical process attaches to it; let alone that it represents any dictate of choice or will".⁹

If now we regard the neurosis from the standpoint of behaviour, we shall be able to discover one of its features which is directly dependent upon environmental changes. There appears to have been a tendency, amongst writers on medical psychology, to consider the phobia as merely one out of many psychoneurotic symptoms, and rather to regard it as something to be dealt with *en passant* than to attach any great significance to its rôle in the psychoneurosis. If we admit, however, that the phobia is universally present and fundamental in psychoneuroses, we shall have advanced at least one step towards placing these mental illnesses on a psycho-physiological basis.

As has been so frequently insisted upon, especially by Rows,¹⁰ the phobia is invariably a conditioned reflex; i.e., the emotional state is aroused through the association, by partial correspondence, of two independent stimuli. Although Pawlow,¹¹ in his experiments upon the dog, refers to the gastric secretion obtained as 'psychic' secretion, the reflex action itself, like other reflex actions, is a physiological phenomenon, but it is attended by conscious sensations. There is every reason to believe that when a similar reaction takes place in man it depends upon similar physiological processes, the mental accompaniments being regarded as merely concomitant or epiphenomenal.

The predominant emotional accompaniment of the phobia-constellation is seen to be fear or the more compound emotion anxiety. It is interesting firstly to consider morbid fear and anxiety

from the viewpoints of the analytical and post-analytical schools. Freud's conclusion is shown by the following statement: "Under certain circumstances, sexual excitations arise that cannot follow their natural course of leading to either physical gratification, or conscious desire for such: being deflected from their aim they manifest themselves mentally as morbid anxiety, physically as the bodily accompaniments of this".¹² Jung says: "Fear is the expression of converted libido", and "fear is the expression of an introversion which has become neurotic".¹³ Introversion is a type of response which may be expressed in terms of inhibition of organized wishes or motor sets, i.e., instincts. Libido, in the sense that Jung uses it, is but another name for the wish itself. Both Freud and Jung indicate indirectly that repression or inhibition is a necessary factor in the production of fear or anxiety.

Fear is the feeling which results from a state of physiological disharmony. This disharmony arises in consequence either of the inhibition of one of the individual's instinctive processes or the mutual interference of two or more: when an instinct is inhibited the result may be anger or fear. Anger obtains when the individual's wish to assert himself is only partially inhibited. Total inhibition leads to fear—or the more compound emotion anxiety.

We may say then that when a neurotic is suffering from a phobia he is in a state of fear or instability. This fear is due to the fact that a certain portion of his environment has an increased value, owing to association with previously experienced fear-producing stimuli. His response to regain stability proves unavailing.

The phobia is the basic factor in psychoneuroses. When it is considered from this point of view the symptomatology of the psychoneurosis follows by logical sequence. The patient becomes watchful and self-centred. These characteristic traits are modes of response specifically directed towards the exclusion of those portions of his environment which are disturbing. His field of easy response has become narrowed, and, passively, situations calculated to cause discomfort are avoided. Memory and concentration are poor because attention, again passively, is directed towards discovering those objects in the environment which should be avoided.

In every neurosis the important question to consider is, "How is the neurotic acting now?"—after the pattern of the behaviouristic question, "What is the organism doing?" The more modern psychologists, such as McDougall¹⁴ and Trotter,¹⁵ have rightly insisted, in opposition to the older, academic psychologists, that man, a social animal, is not to be considered apart from his species. The behaviourist goes further, and states positively that man is not to be considered apart from his environment, that his conduct is in fact

a function of his environment. If in the analysis of phobias one realizes that it is necessary to search invariably the neurotic patient's present environment for the provocative stimuli, the investigation of the neurosis is much facilitated.

Adler¹⁶ bases his 'feeling of inferiority', which is a constant feature of the neurosis, and practically synonymous with Janet's¹⁷ 'sentiment d'incomplétude', upon an organically inferior constitution. It would seem that, in a general sense, the individual with the inferior constitution is especially liable to become phobic: it is through the medium of the phobia, however, that the feeling of inferiority is arrived at. Adler calls the end which the neurotic is struggling to attain, the 'imaginary goal'. The goal is not of necessity imaginary. The neurotic has a clearly-defined goal: he is striving for precisely that *feeling* of power which he possessed before the onset of his symptoms. The portion of his environment with regard to which he has become phobic is a measure of his loss of power.

As a result of the feeling of inferiority the neurotic becomes irritable, suspicious, envious, etc.: his attempts to regain the necessary minimum of power fail, he perceives himself to be upon a level inferior to that of the rest of the community—his gregarious impulses are thereby obstructed: he is in a certain degree cut off from the herd. Moreover, he feels that others measure him by the same standard with which he measures himself, and naturally resents inspection and possible criticism.

The feeling of inferiority, with the resulting 'desire for power', enters also into the dream. This assists in explaining why dreams which appear terrifying are fulfilments of wishes. The neurotic is struggling to preserve his ego. Because his ego has suffered, when sleep arrives, and his higher, inhibitory centres lie dormant, the dream material appears, in visual form, to release him from his sense of inferiority. At one time he is the conqueror, the master of the situation: he has attained his mastery after a period of dire distress. Here the wish fulfilment is clear, even in the manifest content of the dream. At other times he may be the vanquished: then he derives some measure of satisfaction from the fact that the odds against him are overwhelming: thus he levers his ego into a more estimable position. It is noteworthy that in this type of dream the situations presented are often the traumatic ones which have given rise to the patient's phobias. Each of the above types of dream represents reactions on the part of the nervous system in the direction of release from states of tension.

Ernest Jones¹⁸ criticizes, one feels with justice, Jung's conception of the unconscious as an obscure region of the mind, the content of

which is characterized largely by neglect and oblivion. He somewhat scathingly terms it the 'limbo' conception, the unconscious part of the mind being considered as a sort of lumber-room to which various mental processes get relegated when in a state of inactivity or decay. The same remark applies, however, though in a different degree, to the Freudian theory of the neurosis, which, as one cannot fail to see, is pervaded throughout by a subtle animism. The hypothesis that there are two separate strata of the mind separated by a barrier penetrable only by means of hypnosis or psycho-analysis must surely prove in the end untenable. Further, it is difficult to see how 'ideas' and 'mental processes' can with any accuracy be said to exist below the level of consciousness. It is certain that determining neural conditions exist prior to the development of ideas; that these conditions may either give rise to ideas or be inhibited appears equally obvious. One would prefer to call them neural processes which do not attain to the level of awareness.

The acceptance of the behaviourist viewpoint with regard to both normal and abnormal psychology would do much to relieve one of the necessity for assuming the existence of an unconscious mind. The theory of repression can without difficulty be expressed in terms of inhibition of instinctive processes, such inhibition occurring when the release of a motor set or neurogram is directly obstructed; or when two or more asynergic neurograms are simultaneously stimulated; thus a soldier in the trenches may experience anxiety either when his flight into safety is directly prevented by external circumstances, or when the impulse to flee from danger conflicts with herd instincts.

As regards the Freudian theory of the universally sexual etiology of the neurosis, in which Jung concurs to the extent that "co-existing with traumatic experiences . . . there is a special kind of disturbance which can only be described as a derangement in the sphere of love",¹⁹ it is quite obvious that phobias may occur in the sexual sphere, just as they may occur in the sphere of any other instinctive process. The fact that the sexual instinct is apt, by its very nature, to be inhibited can very well account for the frequency wherewith sexuality plays its part. The conception, however, that sexuality is universal and necessarily predominant is untenable—unless it be possible that the sexual instinct is the only one man possesses.

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RIGHT-SIDED HEMI-HYPOTROPHY RESULTING FROM RIGHT-SIDED CONGENITAL SPASTIC HEMIPLEGIA, WITH A MORBID CONDITION OF THE LEFT SIDE OF THE BRAIN, REVEALED BY RADIOGRAMS.

By F. PARKES WEBER, LONDON.

THOUGH in adult, fully-developed persons, hemiplegia of cerebral origin does not lead to marked wasting of the paralyzed parts, it is well known that congenital spastic hemiplegia leads to imperfect growth of the limbs on the paralyzed side, so that a condition of hemi-hypotrophy results. This is what happened in the present patient, but the chief interest of the case is connected with the x-ray examination of the brain.

On Examination.—The patient, R. R., is a woman, age 22 years, with right-sided congenital spastic hemiplegia, sexual infantilism, and a very widespread vascular naevus, chiefly of the superficial 'port-wine-stain' type (*Fig. 1*). On the back of the trunk this port-wine angioma is almost entirely limited by the median line to the left side (*Fig. 2*); in front the distribution, though very irregular (*Fig. 1*), is more extensive on the left than on the right side. In parts, notably in the left cheek, there is, besides the 'port-wine-staining', also a condition of more deeply-seated venous naevus (cavernous angioma). The right limbs are shorter than the left limbs (*see later*). The patient is rather obese and bulky, and in sexual development she is infantile. There is absence of pubic and axillary hair, and she has never menstruated. The mammary regions are bulky, doubtless owing to fat (part of her general obesity). The left eyeball is larger than the right (buphthalmus), owing to congenital glaucoma. Dr. C. Markus, who kindly sent the patient to me, reports that the right eye is normal, but that there is atrophy and glaucomatous excavation of the left optic disc. She is blind in the left eye. The iris of the right eye is grey-blue; the inferior quarter sector of the left iris is similar, but the upper three-quarters sector is brown. In other words, there is a brownish pigment-naevus of the upper part of the left iris, giving rise to a condition of so-called 'heterochromia iridis'.

Röntgen-ray Examination of the Head.—Two skiagrams were taken, so as to obtain a side view, the films being placed on the left side; one of these skiagrams is shown in *Fig. 3*. Another skiagram (*Fig. 4*) gave us an antero-posterior view, the film being placed in front of the face. I have to thank Dr. James Metcalfe for his advice in regard to the taking of the skiagrams and his examination of them. The skull is markedly prognathous—of the 'simian' type. The frontal sinuses are very large. The sella turcica is extremely small



FIG. 1.—Photograph of patient, May, 1922.

—infantile—a feature which should be specially noted in connection with the sexual infantilism and the obesity (*see above*). The left half of the brain appears sclerosed; at all events, it is more opaque and gives a somewhat deeper shadow than the right half of the brain. It seems to occupy only about two-thirds of the left half of the cranial cavity, and to be surrounded by cerebrospinal fluid (external hydrocephalus).

Physical Development.—The patient's body-weight (May 13, 1922) is $70\frac{3}{4}$ kilo. (11 st. $2\frac{1}{4}$ lb.); her height is 148 cm. (4 ft. $10\frac{1}{4}$ in.).

From the acromion to the tip of the middle finger her right upper extremity measures 58 cm., whereas her left upper extremity measures $67\frac{1}{2}$ cm. From the anterior superior iliac spine to the malleolus externus her right lower extremity measures 80 cm., whereas her left lower extremity measures 84 cm. I am indebted to Dr. Scheu for these measurements.

Rectal Examination (Dr. Scheu).—By digital rectal examination the vagina seems long, and one can just reach the cervix uteri;

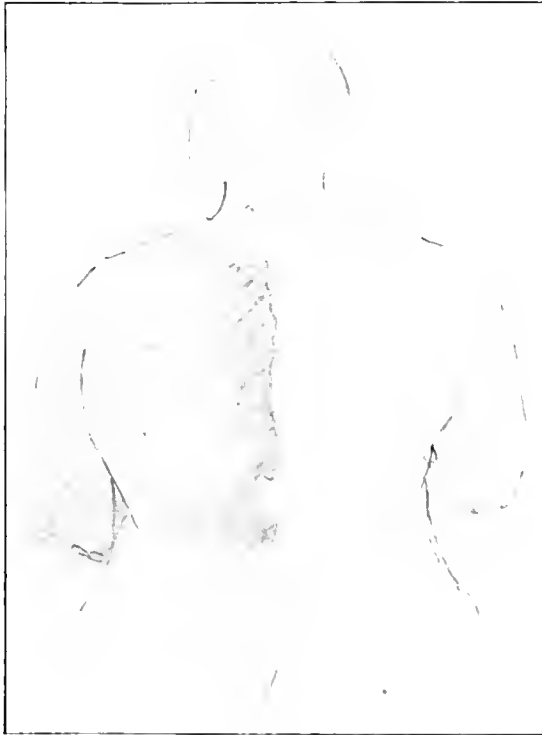


FIG. 2.—From a diagrammatic sketch of the nevus distribution from the back (Dr. Scheu).

probably the uterus is more abdominal than it normally should be, and probably the sexual organs are infantile.

Mental and Nervous Conditions.—The patient can speak and understand ordinary things; that is to say, she is fairly intelligent in ordinary conversation; but she has never been to school. On account of the great paresis in her right upper extremity she can only do a little house-work. There is much less paresis in the right lower extremity. The knee-jerks are very active on both sides. The plantar reflex on the left side is of the normal flexor type; that on the right side is of the extensor type (Babinski's sign).

Whilst the patient was under observation in the hospital there were no convulsions—nor was there apparently a history of any kind of fits. There was no fever. Her pulse was 68 to 88, and her respiration 24. Her brachial systolic blood-pressure was 115 mm. Hg. Her blood serum gave a completely negative Wassermann reaction. The blood-count showed a slight excess of white corpuseles. She passed about 1000 c.c. of urine in the twenty-four hours (according to the chart: but perhaps some was passed with the faeces and not charted). The urine, when tested, was of specific gravity 1025; acid; free from sugar; but containing a trace of albumin, probably due to the presence of some discharge from the vagina. No alimentary glycosuria followed the ingestion of 100 gm. of dextrose (which was

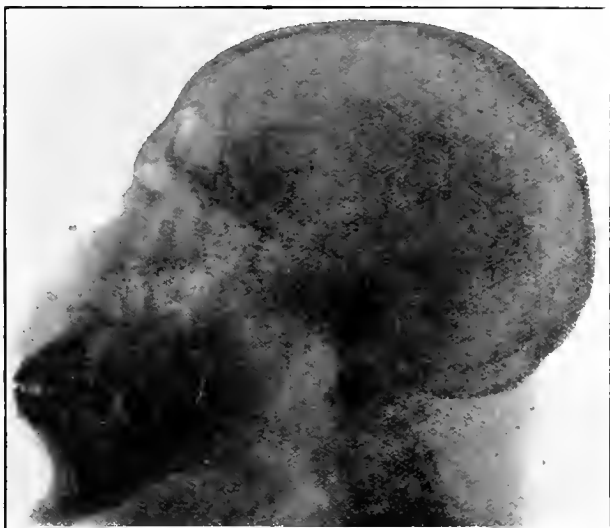


FIG. 3.—Skiagram of the head, lateral view, the film having been placed on the left side.

taken in lemonade): but a trace of sugar was noted in the urine after she was given 200 gm. of dextrose.

In regard to the examination of the patient herself there is nothing further special to note. She is of a Hebrew family. Her mother is an active-looking, well-developed woman, who has a moderate degree of xanthelasma palpebrarum. A sister of the patient is said to have become insane during the war, "after air-raids". Besides these, the mother says she has two healthy children; none have died or were born dead; she has had two or three miscarriages.

Remarks.—The case is one of right-sided congenital spastic hemiplegia and right-sided hemi-hypotrophy, due to a lesion on the

left side of the brain, which is partially revealed by *x*-ray examination. As far as I know, this is the only hitherto published case in which a lesion of the kind has been demonstrated during life by ordinary *x*-ray skiagrams (without the letting out of cerebrospinal fluid, and its replacement by sterilized air or oxygen). This has been possible partly owing to the cranial bones being rather thin, and partly owing to a shrunken condition and abnormal consistence of the brain on the left side and the presence of external hydrocephalus on that side. The abnormal consistence of the left cerebral



FIG. 4.—Skiagram of the head, antero-posterior view, the film having been placed in front of the face.

hemisphere is doubtless due to sclerotic changes or meningeal abnormalities. It is highly probable that the congenital cerebral disease is in some way connected with the presence of a vascular naevus of the meninges or brain on the left side—of the same nature as the extensive vascular naevus of the patient's body.

D. M. Greig¹ has recently published the case of a boy, age 18, in whom right hemiplegia and right-sided convulsions were caused by a meningeal vascular naevus of the opposite side of the brain. The boy likewise presented the condition of adenoma sebaceum of the face—a condition now admitted by dermatologists to be a form of

cutaneous naevus. H. Campbell and Sir Charles Ballance² have published the case of a man, age 23, in whom mild left hemiplegia and occasional left-sided convulsions were due to venous angioma of the cerebral cortex of the opposite side.

In the present case the buphthalmus, due to congenital glaucoma, is probably likewise in some way connected with the naevus condition. One may even think of the possibility that a vascular naevus gave rise, at or before birth, to subarachnoid hæmorrhage on the left side, and that an intra-ocular hæmorrhage was the cause of the congenital glaucoma in the left eye.

The sexual infantilism and obesity are perhaps due to the infantile size of the pituitary fossa, as revealed by *x*-ray examination. But it is impossible to decide whether the hypoplasia of the pituitary gland is or is not in any way causally connected with the congenital disease on the left side of the brain: it is possible that both may be due to meningeal or intracranial vascular naevus-formation.

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Short Notes and Clinical Cases.

CASE OF MESENCEPHALIC TUMOUR WITH DOUBLE ARGYLL ROBERTSON PUPIL.

BY S. A. KINNIER WILSON AND G. DE M. RUDOLF, LONDON.

IN a recent study¹ by one of us devoted to consideration of the Argyll Robertson phenomenon in all its aspects, special reference was made to its occurrence, among other non-syphilitic conditions, in cases of mesencephalic tumour, and several personal observations were cited to prove that this association is not only definite if comparatively rare, but also of great localizing significance. We are able, in this brief communication from the Neurological Clinic at King's College Hospital, to record another example of precisely the same association, viz., a case of cerebral tumour involving the anterior colliculi, and manifesting itself by the combination of paralysis of upward and downward ocular movements with a typical double Argyll Robertson pupil. The case has been followed to autopsy, and the localizing diagnosis made during life has been amply confirmed by the pathological finding.

We wish here to express our obligation to Dr. Raymond Crawford, Director of Medical Studies at King's College Hospital, for his kindness in handing the case over to the Neurological Department.

Clinical History.—J. E., metal worker, age 23, was admitted to hospital on Jan. 26, 1922, complaining of headache and double vision.

The symptoms began with diplopia, in May 1921, but headache did not develop till November, when giddiness and occasional vomiting, independently of food, also set in. On admission, the patient was seen to be somewhat drowsy and listless, with a slow reaction-time: but his mentality was normal, and there was no evidence of implication of the cerebral hemispheres in the disease-process.

Cranial Nerves.—Well-marked double papilloedema* was present, completely obscuring the disc edges, with over 2D of swelling. The visual fields were normal, and the acuity of vision was little if at all impaired. The diplopia persisted, the images being sometimes one slightly above the other, sometimes on the same horizontal level.

Conjugate lateral movement to the right was normal (*Fig. 1*): to the left it was rather less good, and coupled with a tendency to nystagmoid jerking. Conjugate upward movement was very poor (*Fig. 2*), and downward movement even more so (*Fig. 3*), being, in fact, practically nil. Convergence was good and well sustained. The pupils, about $2\frac{1}{2}$ mm. in diameter, were central, circular, very slightly unequal ($R > L$), and reacted well with convergence and on accommodation, yet



FIG. 1. Normal lateral conjugate movement.

both were completely inactive to bright light. In the other cranial nerves no abnormality was discovered.

The Motor and Sensory Systems were intact, with the exception of



FIG. 2.—Almost complete paralysis of conjugate upward movement. Eyes swing very slightly to the right in the attempt to look up.



FIG. 3.—Complete paralysis of conjugate downward movement. Eyes again move slightly to the right in the attempt.

the slightest weakness of the left face, and cerebellar symptoms and signs were absent, though there was a tendency to fall backward when the patient was in the erect position.

The Reflexes (arm and leg) were not brisk, the left abdominal was possibly diminished, and the left plantar a less good flexor than the right.

On Feb. 1 the Wassermann test in the blood was negative, and on April 12 it was negative in the cerebrospinal fluid.

The patient was re-examined at frequent intervals up to the date of his death, May 1, and the following are the chief developments of the case during the three months.

The double Argyll Robertson pupil persisted, and was repeatedly confirmed, till towards the end of April, when the patient's ever-increasing drowsiness, or possibly actual paresis, made testing for convergence-accommodation impracticable. It was noted, however, that in the effort to converge a tendency for the eyes to swing slightly to the right, in conjugate movement, manifested itself. Paralysis of both upward and downward conjugate movement became absolutely complete, and for some weeks before the termination of the case conjugate movement to the left became less good than before. By April 23 this was more definitely impaired, and was associated with frequent nystagmoid jerking in attempts to look to the left. A degree of ectopia pupillæ was observed about this time in both eyes, the pupil being deviated upwards and inwards, but not to a notable extent. The optic neuritis had become intense, and began to pass into a secondary atrophy, coupled with failing visual acuity. Towards the end of March the deep reflexes became steadily weaker, and at the beginning of April a double extensor response was obtained, which persisted at all later examinations. The patient became ever more apathetic and drowsy, kept his mouth open, stared in front of him, lost apparently all power of articulating though attempts were made, and had difficulty in swallowing. Automatic chewing movements were occasionally observed to persist for some seconds after he had swallowed what was put into his mouth. Respiratory embarrassment and eventual failure led to the fatal issue on May 1, as stated above.

Post-mortem.—Examination of the brain, after hardening in formalin for ten days, was made by a complete vertical antero-posterior section through corpus callosum, mesencephalon, pons, and medulla, when the condition seen in *Fig. 4* was at once revealed.

A tumour was found occupying the dorsal part of the mesencephalon in its anterior segment, extending roughly in a spherical fashion from about the position of the pineal gland. It had invaded the overhanging splenium of the corpus callosum and probably had started its growth in the third ventricle, the cavity of which was dilated and its floor stretched. The ventricular aspects of both optic thalami, and the regio subthalamica, were to some extent also involved. Most significant of all, the tumour had invaded and destroyed the anterior colliculi, as is very clearly shown in *Fig. 4*, whereas the posterior part of the tectum and of the iter were intact. The ventral part of the mesencephalon was not invaded, while pons, cerebellum, and medulla were similarly normal.

Microscopical examination of sections of the tumour showed it to belong to the rare group of carcinoma-like growths, apparently derived from the choroid plexus.

To summarize the salient features of the case: A young man develops the cardinal general symptoms of intracranial tumour, viz., headache, giddiness, vomiting, and optic neuritis. The localizing signs are, mainly, paralysis of upward and downward conjugate ocular movement, with conservation of lateral movement. This points unmistakably to invasion of the region of the anterior colliculi in the mesencephalon, and with it is coupled an entirely typical and readily demonstrable double Argyll Robertson phenomenon. Wassermann tests in blood and cerebrospinal fluid are throughout negative. At the autopsy a roughly spherical tumour is found in the dorsum of the mesencephalon, invading and destroying the anterior colliculi.

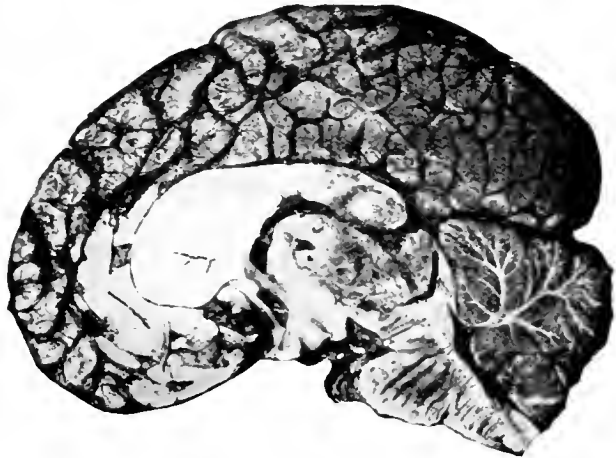


FIG. 4.—Macroscopic view of tumour occupying the posterior part of the third ventricle and destroying, *inter alia*, the anterior colliculi.

This case, thus described very briefly, furnishes ample corroboration both of the contention, for which there is much clinico-anatomical evidence, that one of the chief sites of lesion underlying the Argyll Robertson phenomenon is the region of the anterior colliculi, and of the now generally recognized truth that that sign cannot be taken in any way as an infallible proof of preceding syphilis. The case is to be ranged with those already published by one of us, and previously by Moeli, Farquhar Buzzard, and others, demonstrating these facts, which are deserving of the fullest recognition. The combination of paralysis of vertical eye movements with the Argyll Robertson pupil, not being due to obvious peripheral lesions, is of much localizing importance.

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Critical Review.

THE CEREBROSPINAL FLUID: ITS SOURCE, DISTRIBUTION, AND CIRCULATION.

By R. M. STEWART, WHITTINGHAM.

IF the credit of having first performed lumbar puncture rightly belongs to an American physician, as has recently been claimed,¹ it is nevertheless to Quinke² that we owe the perfection of the technique, and it is still his method, unchanged in any essential detail, which is universally employed at the present day. In the three decades which have elapsed since Quinke's discovery great advances have been made in the study of the cerebrospinal fluid, and from this progress neurology has not failed to benefit, for the introduction of a simple device for the removal of cerebrospinal fluid from the living body opened up a new avenue of approach for investigating the chemical and biological reactions of the nervous system, on which rests to so great a degree our hope of progress in the treatment of nervous disease. Despite, however, the full and fruitful results which have been achieved in the field of its pathology, the cerebrospinal fluid has until recent years suffered neglect at the hands of the physiologists, with the inevitable result that the problem of its origin and circulation is still a subject of much controversy. Fortunately signs are not lacking that with the development of modern experimental methods the process of unravelling the mysteries of its destiny is at last making headway, and that out of the confusion of the earlier investigations clarity is beginning to ensue.

The literature of the cerebrospinal fluid may be grouped on the one hand into a vast series of clinical observations largely concerned with its pathological changes, and on the other, in the report of a considerable amount of experimental work dating from the pioneer studies of Key and Retzius. A review from every aspect would therefore embrace so many ramifications that it seems wiser to confine the present article to certain anatomical and physiological principles which have been the subject of recent research.

ORIGIN.

The Rôle of the Choroid Plexus.—For many years the origin of

the cerebrospinal fluid has attracted attention, and, although the general consensus of opinion is that it is the product of the choroid plexuses, the problem is still far from being settled. The belief that the choroid plexus takes a prominent share in its elaboration was first expressed by Faivre,³ who based his opinion on the presumably glandular character of these structures. Each plexus consists of a highly vascular fringe, beset with a large number of villous projections, and clothed with a layer of cubical cells. Findlay⁴ and other workers have described granular inclusions, staining with osmic acid, which have been looked upon as evidence of cell activity, and under the influence of agents which stimulate secretion changes also occur in the cubical cells which might be interpreted in a similar way, were it not for the fact that the histological appearances differ considerably from those which are said to occur in other glands during physiological activity. Meek,⁵ who employed injections of pilocarpine and muscarine, found that the choroidal cells become larger during secretion, and their cytoplasm differentiated into a clear outer and an inner granular zone. In the case of an ordinary secreting gland, such as the parotid, the alveolar cells become smaller during activity, and the differentiation of the cytoplasm is exactly the reverse of that observed in the cubical epithelium of the choroid plexus. Such an apparent disparity in results naturally suggests some error, and, as Beeht⁶ remarks, the increased height of the choroidal cells following the action of drugs which commonly produce secretion might with equal right be interpreted as proof of an absorptive function. An assumption of this character has indeed been seriously entertained by Loeper, Askanazy, and Hassin.⁷ The latter considers that the function of the choroid plexus is probably "to pick up from the cerebrospinal fluid harmful or other products of nervous metabolism, and to render them, as well as the fluid, more absorbable". Certain pathological changes in the subarachnoid space and choroid plexus from a case of polio-encephalitis are accepted by him as evidence for this view, but his inferences will hardly survive critical examination, and are totally opposed to the findings of Wislocki and Putnam⁸ in their experimental study of hydrocephalus. These observers induced closure of the ventricles in a number of kittens and young rabbits by injecting a suspension of lamp black into the cisterna cerebellomedullaris. Subsequently a readily diffusible solution was introduced into the dilated ventricles, and by tracing its distribution they were able to show that, while absorption does occur to some extent from the ventricles of hydrocephalic animals, the choroid plexus plays no part in the process. Their results have since been confirmed by Nañagas,⁹ whose work we shall have occasion to refer to in a later section.

Pharmacological Experiment.—In addition to histological study, attempts have been made to investigate the possible secretory powers of the choroid plexus by observing the behaviour of the cerebrospinal fluid after the administration of certain drugs. In one method a needle or cannula is introduced into the subarachnoid space, and the rate of outflow in drops measured. It is obvious, however, that such a procedure offers more than one source of fallacy, for the mere introduction of a needle through the occipito-atlantoid ligament cannot afford conclusive evidence of the source of the cerebrospinal fluid, for that which escapes may come, not only from the choroid plexus, but from other subsidiary sources, such as the perivascular lymph spaces. To get over this difficulty Weed¹⁰ catheterized the aqueduct of Sylvius, and by the administration of certain pharmacological agents caused a flow of cerebrospinal fluid which lasted for several hours. In a later series of experiments Cushing and Weed¹¹ obtained access to the ventricular fluid by employing a mid-line puncture directly through the longitudinal sinus and corpus callosum, and in this way were able to avoid the disconcerting complications introduced by other methods of approach. Very similar results were again obtained, for the intravenous injection of desiccated pituitary extract was followed by a secretory response which appeared to be independent of both respiratory influences and hæmodynamic reactions. Halliburton and Dixon,¹² whose researches form one of the most important contributions to this subject, succeeded in demonstrating an apparent hormone action by injecting intravenously extracts of choroid plexus, and also noted that brain extract caused an increased secretion independent of blood-pressure changes. These experiments were subsequently confirmed by Frazier and Peet,¹³ who, in addition, claimed that they had caused an apparent specific inhibitory effect by the injection of thyroid extract.

The method of determining the amount of fluid formed by measuring the rate of outflow was soon replaced by a second, in which an attempt is made to measure alterations in the pressure of the fluid by the use of a manometer. Partial emptying of the subarachnoid space is avoided, and when used in conjunction with apparatus for measuring arterial and venous pressure the manometer was found to give more satisfactory results. Nevertheless, its use is open to criticism, for the pressure conditions favour absorption of fluid along natural channels, and do not exclude the possibility that the pressure under which the fluid is formed may be so low as to be checked by that found at times in this method of determination. To eliminate this possible source of fallacy, Becht and Gunnar¹⁴ devised an instrument for measuring and recording graphically the amount of fluid in the subarachnoid space under pressures slightly less than

normal. Cerebrospinal fluid was allowed to flow out into a Mariotte bottle so arranged that they were able to measure accurately the volume increase of fluid within the bottle without modification of the pressure: the conditions of the experiment also permitted fluid to re-enter the canal with the minimum of interference. The importance of such a method is at once obvious, for if the fluid returns completely to the canal it gives the required proof that there can have been no new formation, as otherwise there should be no room in the canal for the fluid forced out. It was found that neither adrenalin, pituitrin, nor pilocarpine caused any increased formation of cerebrospinal fluid, as in all experiments the outflow during the early stage of the action was followed by a complete re-entry during the period of vascular adjustment. Becht⁶ points out that many of the positive results obtained by other workers may be due to wrong interpretation, *movements* of the fluid being mistaken for *formation* of the fluid. Thus, in the experiments reported by Weed and Cushing the fluid which was observed to escape through a transcallosal puncture may have merely represented preformed cerebrospinal fluid draining through the patent aqueduct of Sylvius from the subarachnoid space. It is also true that an escape of preformed cerebrospinal fluid leads to a consequent reduction of pressure, which in itself may be sufficient to produce changes in the rate of formation. For this reason it is particularly hazardous to draw conclusions from the slow escape of fluid from a needle, and clinical records of the loss of enormous quantities of spinal fluid from the nose or the ear are for the same reason of little value in estimating the normal rate of production.

Another and more serious objection to the outflow method is the inability to judge the effect on the fluid of vascular changes and readjustment. Since the brain is incompressible and enclosed by the bony calvarium, any alteration in the venous and arterial pressures within the skull is bound to exert a marked effect upon the cerebrospinal-fluid pressure, and consequently alter the rate of its escape. In this way the administration of hemodynamic drugs—and it is significant that most of the agents described as having a stimulating effect upon the formation of cerebrospinal fluid belong to this category—may mechanically force out cerebrospinal fluid and lead to a wrong interpretation of increased formation. It is therefore essential, in all experiments of this kind, to measure both arterial and venous pressures within the skull, and the neglect of many workers to do so has undoubtedly led to erroneous conclusions. How sensitive the cerebrospinal pressure is to variations in venous pressure within the skull may be readily demonstrated by any clinician who has occasion to perform lumbar puncture: the slightest degree of constriction on the large veins of the neck leads to an immediate and

marked rise in cerebrospinal fluid pressure—part of the so-called Queckenstedt phenomenon.¹⁵ Beeht and Matill,¹⁶ who have recently published the results of a very able investigation of this subject, conclude that all the changes which have been offered as proof of the secretory mechanism of formation can be logically explained by alterations in venous and arterial pressures within the skull. Their results after the injection of tissue extracts showed very convincingly that in every case where there was a decrease in venous pressure within the skull the fluid pressure also fell: similarly, an increase in venous pressure was always accompanied by an increase in fluid pressure. A parallelism of this kind suggests that the determining factor for the fluid must be venous pressure, and that therefore the fluid pressure changes because of the alteration in venous pressure. In other words, all the changes observed can be readily explained on a mechanical basis, there being no indisputable proof that any of the extracts employed have a specific action on the secretory activity of the choroid plexus.

Pathological Evidence.—Evidence of the secretory function of the choroid plexus may also be obtained from a consideration of certain pathological conditions.

In congenital hydrocephalus cerebrospinal fluid accumulates slowly, causing a progressive dilatation of the ventricular system. The frequency with which a co-existent basal meningitis is found suggests that this condition is caused by some obstruction to the outflow of fluid from the ventricles, and in a number of cases obliteration of the foramen of Magendie has been described. More often, however, the two subsidiary openings discovered by Luschka are sufficient to maintain free drainage from the ventricles into the subarachnoid space, thus explaining the apparent anomaly that obliteration of the foramen of Magendie may not be accompanied by hydrocephalus. Apart from the inflammatory conditions of the base, distention of the lateral and third ventricles is sometimes seen complicating intracranial tumours which are growing in the neighbourhood of the mesencephalon. Usually such a hydrocephalus is the result of obliteration of the mid-brain iter, but more rarely it follows an occlusion of the *venæ Galeni magnæ*, when it is due to an overproduction of fluid which is in some ways analogous to the ascites brought about by stenosis of the inferior vena cava. With this overproduction there is an actual enlargement of the foramina of Monro, Magendie, and Luschka, as there is no obstruction within the ventricular system to localize the dilatation.

Both these types of hydrocephalus have been successfully reproduced on animals. In one series of experiments undertaken in collaboration with Blackfan, Dandy¹⁷ introduced into the aqueduct

of Sylvius a small piece of cotton-wool enclosed in an oiled gelatin capsule. In every animal on whom this experiment was performed, dilatation of the ventricles anterior to the occlusion followed: and when the foramen of Monro was treated in a similar manner, a unilateral hydrocephalus developed. Such experiments afford conclusive proof that cerebrospinal fluid is formed in the lateral ventricles, that absorption in them is at least less than production, and that while the aqueduct of Sylvius is a necessary outlet from the third and both lateral ventricles, there are no collateral channels capable of assuming the function of the blocked iter.

It is evident, however, that this work does not prove the specific point of formation of the fluid, for increased formation might result not only from activity of the choroid plexuses, but from transudation from cerebral capillaries, or from stimulation of the ependymal cells lining the ventricles. In this connection it is interesting to note that Cushing¹⁸ has been able to see the choroid plexus at work in the human subject. "On one or two occasions", he states, "I have had the opportunity in man to observe the main plexus at the bottom of a large porencephalic cavity, emptied of its contents, and have seen the fluid exuding from the surface of the structure."

Evidence of this character, although instructive and no doubt valuable, fails to carry conviction, for if the oozing of fluid from an exposed surface is to be regarded as proof of secretion, then we must also ascribe a secretory function to the arachnoid membrane, which almost always shows some degree of 'sweating' when exposed by operation. More direct and conclusive proof that the choroid plexus is related to the formation of cerebrospinal fluid should be furnished by the experimental removal of the plexuses, but until recently the mechanical abuse which is inevitable in an operation has led to inconclusive results. The credit of having surmounted these difficulties belongs to Dandy,¹⁹ who in a recent independent study has shown that the plexus is one of the points of origin of the cerebrospinal fluid. By means of a transcortical incision he removed the entire choroid plexus of one ventricle, at the same time blocking the corresponding foramen of Monro. After the lapse of three months the animal was killed. It was then found that the blocked ventricle had collapsed to the dimensions of a mere slit. In some animals on whom unilateral choroidectomy had been performed, Dandy obliterated both foramina of Monro, and so obtained a striking contrast between the two sides, one hemisphere showing a collapsed ventricle, and the other a hydrocephalic distention. Dandy's results, therefore, seem to settle the question in favour of the view that cerebrospinal fluid is elaborated by the choroid plexuses of the lateral ventricles, and probably by those of the third and fourth ventricles as well. In this connection

we get little help from morbid anatomy, for although the choroid plexus is subject to cystic degeneration, tumour formation, etc., no cases have been recorded in which the entire structure has been destroyed.

The data derived from microscopic study are still far too meagre to permit any definite conclusions, but a recent communication by Taft²⁰ is highly suggestive. Histological study of the choroid plexus taken from cases of general paralysis showed a progressive fibrous change, beginning with general increase of connective tissue, and followed eventually by an obliteration of the capillaries and formation of fibrous tufts. In view of these findings, and of the abundance of cerebrospinal fluid in this disease, Taft asks whether we are justified in concluding that the persisting ependymal cells are capable of functioning in the rôle of gland-cells in the absence of the capillaries with which they normally stand in relation.

In order to escape from the difficulties encountered in interpreting the above experiments, so contradictory in their results, an alternative hypothesis may be framed without entirely depriving the plexus of the importance usually ascribed to it. It has been estimated by Bard²¹ that the surface area of the choroid plexuses amounts approximately to one square metre, and it is legitimate to assume that the cuboidal cells of so large a surface may play the part of a dialysing membrane quite adequate for a constant supply of cerebrospinal fluid, whose rate of formation will be governed by the physical laws of permeability rather than by the factors which govern secretion.

In this connection the observations of Mestrezat²² are more than usually instructive. In his monumental thesis he points out that the cerebrospinal fluid presents nothing comparable with the products of a differentiated gland, and that its composition may be calculated by taking count only of the dialysable elements of plasma. Furthermore, with the assistance of Mlle. Ledebt²³ he has shown *in vitro* that the fluid obtained by dialysing horse serum through collodion has the characteristic composition of cerebrospinal fluid and aqueous humour. Experiments on living animals also yielded similar results: dialysing sacs introduced into the peritoneal cavity of the dog, rabbit, or guinea-pig became filled with a colourless, limpid, non-albuminous fluid which in its chemical composition was exactly similar to cerebrospinal fluid. Corroborative evidence of the same order was also obtained by an analysis of the contents of a gall-bladder containing 'white bile'—a condition which sometimes follows occlusion of the cystic duct—and Mestrezat concludes by stating that the cerebrospinal fluid, considered from all points of view, is a pure dialysate, there being no evidence to show that it is a true secretion.

RELATIONSHIP OF CEREBROSPINAL FLUID TO NERVOUS SYSTEM.

In man large amounts of cerebrospinal fluid may be obtained by lumbar puncture, and it seems scarcely credible that the enormous quantities which have been observed to drip from the nose in pathological states have had their sole origin in the choroid plexus. Under normal conditions the flow of the ventricular fluid must be very small, for both the aqueduct of Sylvius and the foramen of Magendie are of surprisingly narrow calibre. Furthermore, the possibility of a subsidiary source of supply is suggested by the chemical difference between the ventricular and spinal fluids: that in the ventricles contains a higher percentage of sugar and a lower percentage of globulin than the spinal fluid. The difficulty in explaining these differences has accordingly led to the suggestion that the fluid contained in the subarachnoid space receives an increment from the perivascular spaces, and possibly from the pia-arachnoid itself. It has been known for many years that the blood-vessels of the brain have certain peculiarities of structure not encountered in any other region of the body. Although comparatively thin-walled vessels they are surrounded by an adventitial sheath which extends throughout their whole length down to the minute capillaries. In addition, there are said to be present spaces—the Virchow-Robin spaces—between the media and adventitia which are believed to communicate directly with the subarachnoid space. There is also described a second canalicular system between the adventitia and the brain tissue itself, forming, as it were, a fluid sleeve for the cerebral vessels. By puncture injection of the nervous system His²¹ succeeded in distending the latter system, and was able to follow the injection mass to a plexus beneath the pia. When excessively developed by pathological conditions of the brain, these adventitial spaces of His give rise to a condition which Durand-Fardel²⁵ named *état criblé*. By many authorities the His spaces are regarded as artefacts: Mott,²⁶ however, was able in cases of experimental anemia not only to present evidence of their functional existence but to demonstrate a connection between the perivascular system and the spaces surrounding the nerve-cells. From chemical and histological evidence, he was led to believe that cerebrospinal fluid circulates in these spaces and acts as a medium of gaseous exchange between the blood and nervous tissues. He also suggested that cerebrospinal fluid is absorbed into the cerebral capillaries. More recent work, however, favours the view that the flow is in reality in the opposite direction, the perivascular channels contributing to the cerebrospinal fluid waste products of nerve-cell metabolism. To establish such a theory it is necessary to postulate

a direct communication between these spaces and the subarachnoid space, and in support of such an arrangement existing, Weed²⁷ offers evidence from experiments on animals. He injected into the subarachnoid space a solution containing potassium ferrocyanide and iron ammonium citrate. After completion of the experiment the brain with its meninges was fixed in a formalin solution containing 1 per cent of hydrochloric acid, and in microscopic sections the resulting precipitate of ferric ferrocyanide (Prussian blue) appeared as fine bluish granules. In typical observations in which the ferrocyanide solution was injected under very low pressures for several hours, practically no granules were found in the perivascular spaces. When, however, higher pressures (50 mm. Hg) were employed, the precipitated material could be traced in a continuous collection from the subarachnoid spaces into the perivascular channels. In some cases granules could be identified in the pericapillary spaces, while in others diffuse collections occurred around the nerve-cells. No evidence of passage of the deposits into the cerebral capillaries could be found, and Weed therefore concludes that the flow is towards the subarachnoid space, the perivascular channels serving to carry away products of nerve-cell metabolism, and so in part contribute to the formation of cerebrospinal fluid.

While it would be unfair to ignore the outstanding merit of Weed's experiments, it can hardly be said that they afford very satisfactory proof of his contention. The injection of solutions under considerable pressure into the delicate tissues of the brain constitutes at the best a rather crude experiment; and because a true solution can be forced into the perivascular spaces, it is surely not legitimate to conclude that there is a normal flow of fluid from these spaces into the subarachnoid system. Further, as the injected ferrocyanide solution required for its demonstration in the perivascular spaces both a preliminary cerebral anemia and a pressure of 50 mm. Hg—none being found when low pressures were employed—it is more than possible that communications were opened up which in the normal brain have no existence. Again, if granules can travel readily into minute cerebrospinal channels there seems to be no reason why organisms should not do so also; yet in various types of meningitis where the cerebrospinal fluid is heavily infected, it is most unusual to find evidence of their presence even in the widest perivascular spaces. Dercum,²⁸ who is a vigorous opponent of those who believe that these spaces are in direct communication with the subarachnoid space, points out that if the cerebrospinal fluid is the nutrient fluid of the brain it should bear in its constitution some evidence of the fact; yet under normal conditions it contains no products of nerve-tissue metabolism. Lastly, if, as Weed suggests, cerebrospinal fluid

is partly formed by exudation from the blood into the perivascular system, it should carry with it any diffusible drug or poison which may be present in the circulation. As is well known, there is great difficulty in introducing drugs via the blood-stream into the cerebrospinal fluid, and this difficulty becomes readily comprehensible if it be assumed that there is no communication between the perivascular and subarachnoid systems. That such may, indeed, be the case is indicated by some instructive experiments performed by McIntosh and Fildes²⁹ in an investigation of the factors governing the penetration of arsenic and aniline dyes to the brain. Certain dye substances were found to pass directly from the blood to the brain substance proper without entering the cerebrospinal fluid, a result which it seems impossible to explain if the existence of an intramedullary canalicular system filled with cerebrospinal fluid be granted.

Early writers, impressed by the similarity of the meningeal spaces and the larger serous cavities of the body, looked upon the cerebrospinal fluid as a secretion of the meninges, which they thought might possibly function in a manner analogous to the peritoneum. A contribution from such a source would explain the difference in composition of the spinal and ventricular fluids referred to above, but there seems to be good reason for supposing that the meninges cannot function in this manner. They are histologically unlike any other membrane, for, of their two components, the arachnoid is non-vascular, and the pia is said to possess no capillary bed.

It is customary to ascribe the failure of drugs to penetrate into the nervous system to the barrier imposed by the epithelium of the choroid plexus, which is assumed to exercise a selective activity towards certain substances circulating in the blood. At one time it was thought that only alcohol, acetone, chloroform, and urotropine were able to pass this barrier; but recent investigation has shown that the choroid plexus is permeable to a large number of substances. Spirochaetal agents appear to pass through in a certain percentage of cases, for Hall³⁰ and his associates found arsenic in the spinal fluid of 25 to 35 per cent of a series of cases undergoing salvarsan treatment, and iodine has also been found in appreciable amounts by Osborne.³¹

In lower animals the permeability of the choroid plexus has been fully investigated by Stern,³² who found that among a large number of substances, sodium bromide, sodium salicylate, sodium sulphocyanide, sodium picrate, strychnine, morphine, atropine, santonin, and bile salts regularly make their appearance in the spinal fluid. The chief interest of Stern's work concerns not so much the barrier-like action opposed to the entry of various drugs into the cerebrospinal fluid as the relationship of this fluid to the brain substance.

All the experiments were performed on animals which had been subjected to a preliminary double nephrectomy, and the drugs were administered in massive and often lethal doses. Their presence in the spinal fluid did not therefore necessarily mean that they would reach the cerebrospinal fluid under normal conditions; but it was a remarkable fact that whenever a substance introduced into the general circulation was found in the spinal fluid it was also present in the nervous tissue, and, conversely, in every case in which a given substance entered the nervous tissues it could also be demonstrated in the spinal fluid. Moreover, Stern was never able to detect the presence of a given substance in the brain, either by signs of nervous disorder or by microchemical analysis, if it had failed to penetrate into the cerebrospinal fluid, whereas on the other hand every agent introduced into the cerebrospinal fluid could be demonstrated in the brain by the effects which followed or by appropriate analytical methods.

These results are of considerable importance, for they seem to settle in a most conclusive manner that in its relation to the nervous system cerebrospinal fluid plays the same rôle as lymph, and that every substance contained in the blood must first penetrate into the cerebrospinal fluid before exercising its effects on the nerve elements.

In the interpretation of these experiments there are two possible sources of fallacy which appear to have escaped Stern's notice. In the first place, it is not unreasonable to suppose that the nerve elements of the brain are protected against noxious agents circulating in the blood by the electivity of both the choroidal epithelium and the cells of the brain capillaries. The existence of such a blood-cerebral barrier would give results precisely similar to those observed by Stern: it would not, however, throw any doubt on the validity of Stern's conclusion that substances contained in the blood must reach the cerebrospinal fluid before they can affect the nerve elements. We have already seen that McIntosh and Fildes could not find certain dye substances in the cerebrospinal fluid, although they passed readily from the blood to the brain substance, and Stern's admission that his results with methyl violet were very conflicting probably indicates that this method of experiment is subject to many defects.

One other source of fallacy is the difficulty of making sure that a given substance injected into the cerebrospinal fluid does not reach the brain tissue indirectly—that is to say, by absorption from the subarachnoid space into the general circulation and thence to the blood-vessels of the brain, and until this is shown not to occur, Stern's conclusions must be accepted with caution.

THE AVENUES OF ESCAPE.

It is obvious that if under normal conditions cerebrospinal fluid is being constantly secreted by the choroid plexuses, there must exist a mechanism for its return to the general circulation of the body. Regarding the actual course which the fluid takes, there seems to be general agreement that the pathway of escape is a double one, the major portion of the fluid being absorbed by the blood, and a smaller quantity by the lymphatic stream.

The evidence for this view rests partly on anatomical and partly on physiological grounds. Quincke,³³ one of the earliest workers in this field, recorded in 1872 his experiments on drainage of the sub-arachnoid spaces after the injection of cinnabar. He was able to trace an injection mass along the sheaths of the upper spinal nerves and along those of the optic nerves as far as the episclear space of Schwalbe. Cinnabar granulations were also found in the Pacchionian granulations which project into certain venous sinuses, but none could be identified in the general circulation or in the visceral organs of the body. Later, Key and Retzius,³⁴ by skilful injection of coloured gelatin solutions, furnished evidence of the part played by the Pacchionian bodies. They were able to demonstrate an epithelial covering, and supposed that cerebrospinal fluid passes through stomata between the endothelial cells into the dural sinuses. When, however, it came to be realized that Pacchionian bodies are never found in lower animals, it was felt that this theory of absorption was inadequate, although all the available evidence suggested an actual passage of cerebrospinal fluid into the venous system. At a later date interest in this problem was revived by Leonard Hill's³⁵ contribution to the physiology and pathology of the cerebral circulation. He reported that saline solution coloured with methylene blue and introduced into the cerebrospinal spaces passed straight into the venous sinuses, and after a varying interval could be identified in the bladder and cervical lymphatics. Very similar experiments performed by Cushing³⁶ demonstrated that globules of mercury are able to pass from the subarachnoid space through the cerebral sinuses, diploic and jugular veins, into the right chambers of the heart. The peculiar valvular arrangement at the point of entry of the chyle into the left jugular vein suggested to him that there might be an analogous mechanism of obliquely placed valves along the superior longitudinal sinus, permitting the entry of cerebrospinal fluid, but preventing a flow of blood in the opposite direction.

Another pathway for absorption was put forward by Mott in 1910. This theory, already alluded to, conceives a passage of fluid through the walls of the cerebral capillaries from the surrounding

adventitial spaces; but since recent investigations have shown that the pressure in the blood capillaries of the brain is considerably higher than that of the cerebrospinal fluid, it seems fair to assume that the flow, if any, must be in the opposite direction, that is, from a point of higher pressure (brain capillaries) to a point of lower pressure (subarachnoid space). Dandy and Blackfan¹⁷ studied the rate of absorption of solutions of phenolsulphonephthalein from the subarachnoid space, and concluded that the absorption of cerebrospinal fluid is a diffuse process from the entire subarachnoid space; but their assumption is rather discounted by the recent researches of Weed,³⁷ whose methods mark a distinct advance on those of his predecessors. Using the technique which we have already outlined, he was able to trace fine bluish granules of ferric ferrocyanide from the subarachnoid space into the great sinuses, but could find none in the cerebral veins or capillaries. One of the most important findings in these experiments was the discovery that the Pacchionian body is in reality a pathological transformation of a microscopic arachnoid villus which normally projects from the leptomeninges into the walls of the large intracranial sinuses. It consists of a delicate web-like structure of many interlacing cords continuing the outer arachnoid membrane into the dural walls, its basework being composed of a very fine connective tissue, reticular in structure, and with the general staining qualities of myxomatous tissue; capping this on all sides is a mesothelial covering of arachnoid cells which serve to keep intact the structural characteristics of the arachnoid projection, and in places to act as a cellular filter into the great sinuses. Such villi are invariably met with in normal children, and at all ages in man, being only evident to the naked eye when they have undergone a hypertrophic enlargement—the Pacchionian granulation. Weed was able to exclude the possibility of fluid passage through stomata between the mesothelial covering cells, but on the whole the results seemed to indicate that the process of drainage is through a cellular membrane. Weed concludes with the statement that the chief mode of return of cerebrospinal fluid is by a process of filtration through arachnoid villi into the great sinuses. In other words, the cranial portion of the nervous system seems to contain the efficient mechanism for the absorption of cerebrospinal fluid.

The Accessory or Lymphatic Pathway of Absorption.—Not only have the cranial and spinal nerves a leptomeningeal sheath for varying distances, but there is also around each a perineural space which can be injected from the subarachnoid system, and by using his ferrocyanide method Weed succeeded in demonstrating the possibility of absorption through the lymphatic system. Granular material was traced along the sheaths of the olfactory nerves to the walls of the

nasal cavity, and in experiments in which the fluid was under very high pressure, fluid was observed to drip from the nose of the animal. In the optic and other cranial nerves the findings were on the whole very similar, and the blue precipitate could be traced into the lymph nodes of the neck. With regard to drainage from the spinal subarachnoid space, the anatomical conditions found there are rather different from those in the cranial cavity, there being neither dural sinuses nor arachnoid villi. In a large series of spinal subarachnoid injections Weed was never able to observe the passage of granules into any spinal vessels, but there was an obvious perineural deposit which could be followed a short distance along the anterior and posterior roots. It is therefore likely that the sole pathway of escape from the spinal meninges is along lymphatic channels, and that therefore drainage from the spinal subarachnoid space is a very slow process.

Another possible spinal path of absorption has been suggested by Kramer,³⁸ who claims to have shown that if methylene blue be injected into the spinal subarachnoid space the tissues about the central canal become stained, the dye-stuff having apparently ascended in the canal from a patent caudal metapore. Confirmation of his experiments is lacking at present, but it is interesting to recall that in certain fishes the central canal opens into the surrounding tissues.

The Normal Rate of Absorption.—There is probably no question which offers greater difficulties than that which concerns the rates of formation and absorption of the cerebrospinal fluid. In the case of the blood it is a comparatively easy matter to devise an instrument for measuring the velocity of its flow, but the difficulties in investigating the rate of circulation of the cerebrospinal fluid are very great, for not only is the fluid confined to a system placed in a most inaccessible region, but the total amount in circulation is never very much, especially in the case of lower animals. Hence it is not surprising to find opinion much divided, some authorities holding that the cerebrospinal fluid is renewed four or five times in the course of twenty-four hours, and others maintaining that there is little or no movement unless the pressure of the fluid be artificially lowered.

One of the most important methods of attacking the problem is that in which certain drugs or dyes are injected into the subarachnoid space, and records made of the time required for their appearance in the blood or urine. Leonard Hill³⁵ found the urine coloured in less than twenty minutes after an injection of methylene blue into the cisterna magna, and more recently Frazier and Peet,³⁹ using intraventricular injections of phenolphthalein, obtained an excretion of about 50 to 60 per cent of the dye within two hours. Very similar results were recorded by Dandy and Blackfan⁴⁰ in their study of

experimental hydrocephalus. After subarachnoid injection the dye appeared in the blood in three minutes, and in the urine in six minutes, about 35 to 60 per cent being recovered in the latter situation at the end of two hours.

Mehrtens and West⁴¹ observed that diseases of the nervous system cause a lengthening of the appearance time to as much as seventy minutes in some cases, and in cases of dementia præcox Webster⁴² found that the time varied from twenty-three to a hundred and four minutes in the case of the former, and from twelve to sixty-eight minutes in the latter. The dye remained in the lumbar or thoracic regions, and was completely absorbed or destroyed before it could reach the cranial region, as repeated cisternal punctures made at six-hour intervals showed in every case a clear fluid free from all trace of colour.

The little which we know at present concerning the metabolism of the nervous system suggests that katabolic processes are more active in the cerebrum than in the caudal segments of the cerebrospinal axis, and that therefore on the convex surface of the brain a larger provision must be made for the discharge of waste products than is necessary elsewhere. That such an arrangement has been provided by nature is indicated by the large number of venous sinuses and arachnoid villi in this neighbourhood. Their importance as avenues of escape is clearly shown by the ease with which communicating hydrocephalus may be produced experimentally. By enclosing the mid-brain of a dog with a strip of gauze saturated with an irritant, Dandy⁴³ found it possible to prevent the passage of the cerebrospinal fluid to the subarachnoid spaces over the cerebral hemispheres. The area in which the absorption of cerebrospinal fluid could occur was thus limited to about one-fifth of the normal amount, and rapid dilatation of the ventricles ensued. On the other hand, exclusion of the spinal subarachnoid space has had little or no effect on the rate of absorption, for Weed found that dye-stuffs injected into the cerebellar cistern could be recovered from the urine in a period hardly longer than when the whole system was functioning. Potassium ferrocyanide could be detected in the urine twenty minutes after its introduction in the lumbar region, but when the cranial mechanism was excluded by ligature of the cord in the lower cervical region the dye was not excreted until the lapse of seventy-five minutes.

In the course of their experiments on the cerebrospinal fluid, Dixon and Halliburton⁴⁴ employed substances of different molecular size, and found that those which disappeared from the fluid did so by a process of diffusion, whose rate was slower or faster in proportion to the size of the molecule of the agent injected. The introduction of substances like adrenalin, nicotine, and atropine produced

characteristic physiological effects almost as rapidly as if introduced into the venous circulation, while other non-diffusible substances, such as proteins, failed to give rise to characteristic effects.

Next in historical sequence come the experiments of Becht,⁶ who covered much the same ground as Dixon and Halliburton. He found no satisfactory proof of rapid absorption from the subarachnoid space, for neither adrenalin nor nicotine caused any characteristic rise in blood-pressure. These substances could still be identified in the spinal fluid several hours after the experiments, for in every case where the fluid was withdrawn from the canal and injected intravenously the usual blood-pressure changes followed, clearly showing that an absence of effect after intrathecal injection was not due to a failure to inject the drug nor to a failure of response on the part of the animal. It is to be regretted that these experiments have not been confirmed by other workers, since Becht concludes that so far no indisputable evidence of the source or circulation of the cerebrospinal fluid has been furnished, and does not hesitate to attribute the results recorded by others to faulty technique or wrong interpretation. As an illustration of his vigorous criticism we may quote from his remarks on the rate of absorption of the fluid.

“Attempts to get at this problem indirectly have led to questionable and we believe erroneous conclusions. Frazier and Peet, working with phenolsulphonephthalein, found that if the drug is injected into the ventricles under normal conditions about 50 to 60 per cent is excreted into the bladder within two hours. They then conclude: ‘If we assume that the cerebrospinal fluid is absorbed proportionately as rapidly as the amount of phthalein injected, *and there is no reason for believing otherwise*, we are led to the conclusion that at least 50 to 60 per cent of the cerebrospinal fluid is absorbed every two hours’. We cannot agree with this conclusion. The absence of proof that an assertion is untrue does not prove that the assertion is true. In this instance it cannot be assumed—it must be proved—that all of the constituents of the cerebrospinal fluid are absorbed in the same proportion to the whole of the drug; otherwise the possibility of the selective absorption of a foreign material is not eliminated. It would be just as sound reasoning to assume that since from 50 to 60 per cent of the phenolsulphonephthalein has been excreted from the kidneys in two hours, 50 to 60 per cent of the water and other constituents of the blood had been eliminated in that time. Assuming the weight of the blood to be one-tenth of that of the body for animals, and the blood to be two-thirds plasma, then in a man of 60 kilos weight there should occur in two hours the excretion of 2 to 2.4 litres of urine, or 24 to

28.8 litres in twenty-four hours. This is of course preposterous, and proves that the drug must be selectively excreted from the kidney and is not excreted in proportion to all the other constituents of the blood. This same activity must be proved to be absent before the conclusions of Frazier and Peet become at all convincing."

THE CIRCULATION OF THE CEREBROSPINAL FLUID.

We have already seen that a large amount of experiment and pathological observation points strongly to the choroid plexuses as the chief source of the cerebrospinal fluid, and that the evidence for its escape through arachnoid villi and lymphatics is no less definite. There now remains for consideration the probable course taken by the fluid between its points of origin and exit. Surrounding the central nervous system and acting as an efficient fluid cushion, the cerebrospinal fluid lies wholly within delicate spaces between the arachnoid and pia mater. These spaces are lined everywhere by flattened mesothelial cells. Upon the surface of the cerebral hemispheres the confined fluid is present only as a capillary layer, but at the base of brain the arachnoid trabeculae widen to form the arachnoid cisterns.

The stream of cerebrospinal fluid is believed to start within the ventricles and to pass out through the foramen of Magendie and those of Luschka into the subarachnoid spaces. The fluid in both lateral ventricles flows freely through the foramina of Monro into the medially situated third ventricle, and thence it escapes through the aqueduct of Sylvius into the fourth ventricle. The existence of the three openings in the roof of the fourth ventricle has at various times been called into question: but recent morphological studies indicate that they are true anatomical openings in the velum, and not artefacts caused by the histological methods employed for their demonstration. Moreover, experiments have shown that if phenol-sulphonephthalein is injected into the lateral ventricle it will quickly make its appearance in the subarachnoid space. If air, in the place of coloured solutions, be introduced, it will pass externally into the cisternae, and with the aid of the *x* rays Dandy¹⁵ has been able to demonstrate its actual passage through the foramen of Magendie. What happens to the fluid after it has reached the cisterna magna is somewhat doubtful, but it is generally assumed to pass in two directions, upwards over the cerebral hemispheres and downwards into the spinal subarachnoid space. In the former locality it bears important relationships to the dura mater, for the arachnoid villi come to lie directly beneath the vascular endothelium of the large dural sinuses, and are so in a position to facilitate the escape of cerebrospinal fluid into the blood. On the other hand, in the spinal

system there are neither dural sinuses nor arachnoid villi, and consequently the fluid must either pass backwards to the cranium or escape through the lymph channels in relation to the spinal nerve-roots.

The question of how far the cerebrospinal fluid serves as the lymph of the brain is one of great practical importance in view of the attempts which have been made to influence syphilitic disease of the brain by intraspinal therapy, but unfortunately it cannot as yet be answered. The conflicting views of Mott and Weed have already been referred to, and most recent work does not make the presentation of this problem any clearer. Monakow¹⁶ introduces further complexity by suggesting the existence of two distinct circulatory systems within the nervous system. In the first place he assumes that the ventricular fluid passes outwards between the lining ependymal cells into the brain substances, where it bathes the nerve-cells prior to its discharge through the perivascular spaces of His into the subarachnoid space. Secondly, another canicular system represented by the Virchow-Robin spaces is thought by him to be concerned with the removal of foreign particles, undissolved products of degeneration, etc., which are ultimately carried by scavenger cells through meningeal lymphatics to the lymphatic glands of the neck.

To a certain extent Monakow's speculations are confirmed by the observations of Stern³² on the relations of the cerebrospinal fluid to the nervous system and general circulation. Certain substances injected into the ventricles were found to give effects more pronounced, more enduring, and much earlier in their appearance than when injection was made into the subarachnoid space. Furthermore, microscopic examination showed that while ferrocyanide of potassium readily penetrated the brain substance in the neighbourhood of the ventricles, none could be identified in the nerve-tissue if the injection was given beneath the dura mater. Stern concludes that under normal conditions the current of cerebrospinal fluid is directed from the cerebral ventricles towards the subarachnoid space, the former being the afferent and the latter the efferent path of the system. The relationship between the cerebrospinal fluid, the nerve elements, and the blood may therefore be represented schematically as follows:—

Blood → ventr. cs. fluid → nerve elements → subarachnoid cs. fluid → blood.

At the same time Stern is willing to allow that this schema does not rule out the possibility of a circulation through the various foramina connecting the ventricles and basal cisterns, but he claims that the view put forward by him explains in a more satisfactory manner the lack of results attending the injection of certain substances into the subarachnoid space. A careful

perusal of his paper, however, shows that the anatomical relationships of the cerebrospinal fluid as conceived by him are totally different from those of the majority of workers. This is clearly indicated in the paragraph devoted to a discussion of the possible identity of the fluid in various localities, for he states: "En parlant du liquide céphalorachidien nous avons eu en vue l'ensemble de liquide remplissant les espaces *sous-duremériens*, intraventriculaires, périvasculaires, et péricellulaires" (italics ours). He then passes on to compare the effects of various agents injected intraventricularly with those produced by subdural injection, and notes that the exciting agents when introduced beneath the dura were often without effect, or at the most induced a very delayed result. Now if there is one point on which all observers are agreed, it is that the subdural and subarachnoid spaces are anatomically and physiologically distinct, with no communication of any kind between them. The arachnoid membrane appears to be a rigid and impenetrable barrier, and hence Stern's experiments with subdural injections do not in any way prove that absorption is more rapid in the ventricles than in the subarachnoid space.

Before concluding this section, reference must be made to the work of Nañagas⁹ on absorption in the closed ventricles of hydrocephalus. It had been previously shown by Weed and McKibben⁴⁷ that intravenous injections of salt solutions of varying concentrations had a very definite and rapid effect on cerebrospinal-fluid pressure. A 30 per cent solution of sodium chloride caused a marked reduction of pressure, the fall in some cases being below zero, and, conversely, intravenous injections of distilled water were followed by a marked and sustained rise of pressure. These discoveries suggested to Nañagas that the interesting problem of absorption in the closed ventricles might be studied experimentally. Having produced hydrocephalus in kittens by subarachnoid injection of a suspension of lamp black, careful records were taken of the intraventricular pressure before and after the administration of salt solutions. It was then shown that intravenous injections of hypertonic solutions caused a marked fall in pressure, and that the opposite effect could be obtained when hypotonic solutions were given.

Having in this way established physiological proof that the volume of cerebrospinal fluid in the closed ventricles may be increased or diminished experimentally, Nañagas proceeded to investigate the way of absorption from the ventricles, using for this purpose the injection method of Weed. In microscopic sections the precipitate of Prussian blue was found to be most abundant in the neighbourhood of the ependyma of the lateral ventricles. It could also be traced in zones of diminishing intensity in the grey matter of the brain for a

varying distance from the ventricles, but in no cases was the cortex affected. Blue granules were found within the cytoplasm of the ependymal cells, in the tissue intervening between them, in the interior of minute capillaries, and, further away, in vessels which were identified as veins. The cerebral arteries and the vessels of the choroid plexus were entirely free from precipitate. In control animals not subjected to experimental hydrocephalus the replacement of the ventricular fluid by ferrocyanide solution brought about an absorption very limited in distribution, and Nañagas is compelled to admit that intraventricular absorption in the normal animal must be of almost minimal physiological importance.

Apart from the established fact that in hydrocephalic animals fluid can escape into the capillary bed of the brain, there is little in the work of Nañagas to confirm the hypothesis put forward by Monakow. It is, also, more than likely that the tremendous osmotic pull exercised by the hypertonic solutions brings about a state of affairs totally different from that which obtains in the normal brain. Nañagas himself points out that hypotonic solutions have an effect the opposite of that seen when strong solutions of sodium chloride are injected. Instead of being aspirated into the shrinking nervous system, the cerebrospinal fluid receives a marked accession of fluid from those same capillaries which are credited with an absorptive function when hypertonic solutions are employed. In other words, his experiments seem merely to prove that by varying the osmotic pressure of the blood it is possible either to force cerebrospinal fluid from the ventricles into the cerebral capillaries, or to cause a flow of fluid from the latter in an exactly opposite direction.

In one particular the results reported by Nañagas are in direct conflict with those of Weed. The latter was never able to find particles of Prussian blue in the cerebral vessels, although they almost filled the perivascular spaces, and this distribution was used to support his belief that there is no absorption of cerebrospinal fluid into the vessels of the brain. The explanation of such divergent results appears to be simple: Weed performed his experiments under conditions imitating as far as possible the physiological, whereas Nañagas used a method whose effects have no possible counterpart in the normal animal. Such considerations serve to accentuate the incompleteness of our knowledge of this subject, and suggest that the experiments outlined above require to be supplemented by further research before they can be accepted as proof of an intracerebral circulation of cerebrospinal fluid.

Circulation in the Spinal Subarachnoid Space.—From what has preceded it is evident that the rate of absorption from the spinal subarachnoid space is very much slower than in other localities. The spinal fluid may, indeed, be compared with a nearly stagnant canal

ending blindly and discharging its contents through a limited number of minute channels. Nevertheless, attempts have been made by various writers to prove that not only does the cerebrospinal fluid circulate briskly in this region, but that it follows a downward and upward course through very definite channels. Propping,⁴⁸ for example, thought that the flow was downwards along the anterior aspect of the spinal cord, and in a reverse direction in the posterior compartment of the arachnoid sac. He believes that fluid movements are brought about by the influence of respiratory changes on the veins inside the spinal canal: during inspiration they collapse, and so cause a suction of cerebrospinal fluid out of the cranium; during expiration the return of this aspirated fluid is prevented by a kind of valve placed anteriorly, and in consequence spinal fluid flows from the caudal end of the sac upwards along the posterior surface of the cord. Such a theory receives no support from anatomical, physiological, or clinical observation. In the first place, the anterior and posterior compartments of the spinal subarachnoid space are very incompletely separated from each other by the ligamentum denticulatum and other septa. Then again, not only do the veins of the spinal canal collapse during inspiration, but also those within the cranium, and it is therefore impossible to understand how any suction effect can be produced. Lastly, if a true flow in special paths occurs, the injection of anæsthetic substances for securing regional anæsthesia would be anything but a satisfactory procedure.

That the degree of movement of the spinal fluid is almost negligible is indicated by the work of Weigelt⁴⁹ on the composition of the cerebrospinal fluid in different regions of the subarachnoid space. For the details of his work the reader must be referred to the original paper: it is sufficient to state that he spent two years examining fluids from the ventricles, the cisternæ, and the cervical, dorsal, and lumbar regions of spinal sac, making in all 1500 punctures. In both normal and pathological fluids the number of cells and the amount of albumin showed a progressive increase from the cervical to the lumbar region, a finding hardly consistent with the view that fluid circulates in the spinal subarachnoid space. Certain experiments by Becker⁵⁰ seem to establish the fact that although the spinal fluid has no true circulation, it is nonetheless far from being altogether at rest. This worker claims to have shown that during ventricular systole rhythmic expansion of the brain causes a movement of fluid towards the caudal end of the subarachnoid system, followed during diastole by a return in the opposite direction. The effect of the pulsating spinal vessels is very slight, but those of the brain give rise to oscillations which, after conversion into sine waves, are propagated through the cerebrospinal fluid at a rate of about 3 metres per second. To a lesser extent respiratory waves

pass in the same direction, and may compound with those of vascular origin. There is thus promoted a constant ebb and flow sufficient to ensure a certain degree of mixing of the fluid and its contents.

SUMMARY.

1. On the whole there is almost complete unanimity of opinion that the choroid plexuses are the chief source of the cerebrospinal fluid. This conception rests not on any single conclusive piece of evidence, but on well-established data derived from histological, pharmacological, and pathological observation.

2. The question of whether the cerebrospinal fluid is a true secretion or a dialysate cannot as yet be fully answered.

3. The possibility of subsidiary sources of supply, either by drainage from the perivascular spaces or from the membranous surfaces of the brain must be considered.

4. Conclusive proof that the cerebrospinal fluid functions as the lymph of the brain is at present lacking.

5. Thus far the methods devised for computing the rates of formation and absorption are unreliable.

6. Absorption of cerebrospinal fluid takes place by a process of diffusion through microscopic arachnoid villi into the large dural sinuses, and to a lesser extent through the lymph sheaths of the cranial nerves.

In the spinal subarachnoid space the fluid is drained by way of the lymphatic system only.

7. Cerebrospinal fluid circulates in the ventricles of the brain and in the subarachnoid space surrounding it. Whether it also circulates in the substance of the brain remains to be established. Movements of the fluid in the spinal subarachnoid space are probably minimal in degree.

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Editorial.

THE SCOPE OF NEUROLOGY IN HOSPITAL PRACTICE.

THERE can surely be no one of us who is not at times troubled as he reflects upon the smallness of his achievements in the practice of healing. And none perhaps is forced more often to a confession of his impotence than the neurologist in face of organic disease. For himself he may indeed gain some intellectual pleasure from the solution of nice problems in localization and pathological diagnosis. He may through years of patient research, correlating symptoms with signs, and both with post-mortem evidence, advance our knowledge of the nervous system and of the first signs of disease therein. Such work is of abiding value to humanity; yet even in the achievement it may at times prove cold comfort to the practising physician; for in the majority of cases there is little he can do for the individual patient who seeks his aid. Syphilis of the nervous system, it is true, provides a group of satisfactory exceptions to the rule, but for the rest it is mainly a matter of bowing to the inevitable.

Small wonder that in a country less bound by traditional distinctions the neurologist seeks in the profession and art of surgery an outlet for his desire to help. In a recent review, Professor Harvey Cushing has summarized the advances made of late years in the field of neurological surgery, and has shown in his own practice the results both of amelioration and cure which may be obtained in certain cases. There is much to be said for such a combination of physician and surgeon's art in a single special branch of medicine; but in this country, for the present, prejudice is too strong against it. Moreover, one may safely predict that in exceptional cases only will men be found with a capacity for acquiring the technical skill required for both diagnosis and operative procedure. The former demands the training of a physician, the latter some experience of general surgery.

Looking, then, in other directions for the satisfaction of his humanitarian impulse, the neurologist may at any rate, in cases of functional nervous disease, find problems of immediate and practical importance to the individual patient. We should estimate that

more than one-half of the persons who seek relief at the neurological out-patient department of a general hospital are suffering from functional as opposed to organic disease. Here is a challenge to therapeutic skill, and at the same time a problem of great difficulty. We have to deal now with symptoms depending not upon irreparable damage to fixed structures, but upon the reaction of labile forces of personality to environmental stresses.

Thanks largely to the stimulating force of Freud's work, there is a steadily extending belief that these patients need something more than a bottle of medicine and a few words of reassurance. We know that in most cases symptoms may be removed and suffering relieved by means of rational psychotherapy. Yet at the majority of general hospitals facilities for such treatment are sadly lacking. In this respect it behoves neurologists to realize their responsibilities, to demand and persistently demand that this defect be made good.

The chief need is for trained personnel both in the wards and in the out-patient departments. The number of men interested in this branch of medicine is limited. The average house officer during his period of hospital appointments is too keenly occupied with the grosser problems of organic disease to be bothered with functional cases. It is only later, when he finds himself in practice, that he realizes with regret his inability, from lack of training, to cope with the multitude of 'neurasthenics' that throng his surgery.

As a first measure, let us ask for the appointment at each of the large hospitals of a resident house officer for the department of nervous diseases. This appointment should preferably be open to men who have already held the post of house physician or house surgeon. We have no doubt that suitable candidates would be forthcoming.

Tracing to its source the general want of knowledge of this subject among medical students, let us next plead for the introduction of lectures on the elements of psychology into the year's course of anatomy and physiology. These, we feel sure, would attract large audiences, would interest the many and stimulate the few, who, as senior men, would develop into capable clinical assistants.

Finally, let us demand small neurological wards, male and female, in charge of a nursing staff who will take an active interest in these difficult patients—wards in which a tradition of sympathy and understanding will arise, and in which the sister handing over to the head nurse will no longer say with a shrug of the shoulders that "Number 12 is only functional".

In such matters we are far behind the best general hospitals of the United States. The recent formation in this country of a National Council for Mental Hygiene marks a step forward in principle. Under its aegis we hope that the reforms which we have

outlined will be put into execution within the next few years. The united support of all neurologists holding hospital appointments will be necessary to this end, and this, we should take it for granted, would be forthcoming were it not for a regrettable fashion in certain neurological circles to let pass no opportunity for decrying the cult of clinical psychology.

It is of no use for the neurologist to disclaim responsibility for this work on the plea that it belongs to the province of the psychiatrist. In the phraseology of the lay public, these patients are 'suffering from nerves', and it is to the department for nervous diseases that they come, and will continue to come, in their hundreds.

Abstracts.

Neurology.

PHYSIOLOGY.

- [32] Do internal or preformed speech centres exist in the human brain? (Existe-t-il dans le cerveau humain des centres innés ou préformés de langage?).—PIERRE MARIE. *Presse méd.*, 1922, xxx, 177.

THE question of speech centres, during the past sixty years, has been very much to the fore as a result of the study of aphasia. The author states that it is not to anatomy, to pathological anatomy, to physiology, or even to clinical medicine that we must look for enlightenment on the subject. What we need is common sense (*simple bon sens*) when asking ourselves the question, "Does the brain of the newly-born contain special parts, definitely localized, possessing a pre-established function of presiding over spoken and written speech?" The most valuable answer is provided by the study of the evolution of language—both spoken and written—all down the ages.

1. *The Evolution of Written Speech.*—Writing originated as graphic representations of whatever it was desired to communicate. Such graphic writing might consist simply of animals or might be sufficiently elaborate to depict events.

But written speech is of a much higher order—it is the reproducing of spoken speech by means of written characters, and the ability to perform this took thousands of years to develop after graphic writing was well established.

Ancient Egypt, by means of the writing on its monuments, furnishes us with the following stages in the development of writing:—

a. First period of simple graphic representation, e.g., signs for the sun, an eye, a mountain, etc., which were used to represent certain abstract ideas, to indicate movement, and so on;

b. Second period of phonetic representation, in which writing was used to reproduce spoken sounds, this leading on naturally to the identifying of the graphic signs with the spoken sound.

The alphabet then arose by only the initial portion of the graphic sign which constituted a letter—being used for the particular spoken sound. These fundamental periods were the work of the ages. It is time which has slowly but surely shaped language as it is known to-day, rather than

the presence of innate centres in the brain of man. Written language, Marie holds, is an acquired function, and this accounts for its slow development over thousands of years. Ability to write, too, in the middle ages was confined to a very few, who acquired it slowly and painfully rather than by possessing inherited innate centres in the brain.

2. *The Evolution of Spoken Language.*—Marie attacked the dogma of the third frontal convolution as far back as 1906, and stated his belief that it had nothing to do with the speech function. His belief now extends to the statement that "in the human brain there do not exist innate centres for spoken speech any more than for written speech". Lesions of Broca's area occur without aphasia. In soldiers whom he has examined, it is from wounds of the parieto-occipital cortex that aphasia results. Follows an exposé of the early teachers of the Broca's area dogma (Gall, Bonilland, Broca). Broca's first case was one in which softening involved most of the cortex round the fissure of Sylvius as well as the third frontal convolution.

Marie believes there is "no preformed innate centre even for spoken speech in the human brain". Pathological anatomy has failed to show a degeneration of a tract concerned with speech in aphasic persons. The paths drawn in the text-books are products of the imagination. If an innate centre existed, it should possess a path of its own for the innervation of the organs of speech. The site of the lesion in aphasia is in the association fibres and not the projection system, and thus aphasia is a disorder of association, i.e., a psychic disturbance. Again, the other recognized innate centres are bilateral and symmetrical, and this is a further argument against the present theory of localized aphasias. Deaf-mutes, everyone is agreed, are unable to speak solely because they are deaf. If innate centres were present, some efforts at speech, however grotesque, would occur. In the child of twelve months, all the functions resulting from innate centres (walking, feeding, crying, etc.) are being exercised. Speech alone is undeveloped. Where such a child has a right hemiplegia, speech development is not interfered with: there is no innate centre to be destroyed. The undamaged portion of the brain is able to acquire the speech function.

Speech is normally developed by the adaptation of the cortex constituting the aphasic zone (left Sylvian cortex), the process being exactly similar to the cortical adaptation effected when we learn games of skill. The level is psychic, not psycho-motor.

It is with some surprise that one finds no reference to the work on aphasia of Dr. Henry Head, who has stated that "a unilateral lesion of the brain affecting the use of language disturbs a number of psychic processes which cannot be grouped under such headings as speech, reading, writing, etc." He applies to these processes the term 'symbolic thinking and expression', because they consist mainly of the use of symbols in language and thought—which statements seem to summarize the substance of this lecture.

W. JOHNSON.

PATHOLOGY.

- [33] **Experimental hydrocephalus.**—W. E. DANDY. *Trans. Amer. Surg. Assoc.*, 1919, xxxvii, 397.

GENERAL acceptance of the obstructive theory of hydrocephalus has for long been prejudiced by the impressive argument that in most cases there is no apparent obstruction or, indeed, cause of any kind. In the present contribution Dandy advances experimental evidence in proof of his contention that the commonest cause of all types of internal hydrocephalus is diminished absorption of cerebrospinal fluid, following obstruction of its outlet from the cerebral ventricles or subarachnoid space.

In one series of experiments a small piece of cotton enclosed in an oiled gelatin capsule was introduced into the aqueduct of Sylvius. Dilatation of the lateral and third ventricles resulted. The dogs on whom this procedure was performed became lethargic, and suffered from intermittent vomiting. Enlargement of the head was not noted, as the animals were of an age when the sutures are closed. It was also found possible to produce a unilateral hydrocephalus by blocking the foramen of Monro with a piece of transplanted fascia or peritoneum. If at the same time the entire choroid plexus was removed, the ventricle, instead of enlarging, became obliterated, thus affording conclusive proof that cerebrospinal fluid is formed by the choroid plexus, and that the ependyma lining the ventricles is not concerned in its production.

In another smaller series of experiments the Sylvian aqueduct was occluded after extirpation of the choroid plexus from both lateral ventricles. This was followed by a slowly-developed hydrocephalus owing to the production of fluid by the intact plexus of the third ventricle. Ligation of the vena magna Galeni close to its origin gave rise to ventricular dilatation; but in this type of experimental hydrocephalus the aqueduct of Sylvius and the foramina of Monro, Magendie, and Luschka all become enlarged, because the accumulation of fluid is due to over-production, there being no impediment to localize the dilatation.

While the appearances produced experimentally were very similar to those seen in the idiopathic hydrocephalus of children, Dandy considers vascular occlusion a rare cause of hydrocephalus with communication. Such cases are far more commonly due to adhesions which obliterate the basal cisternae. To disclose adhesions and obliteration of the subarachnoid space, the brain must be studied during its removal; subsequent examination of the brain reveals but little, as the adhesions are liberated by removal of the brain, and the gross appearance of thickened pia-arachnoid is not striking after fixation.

The proof of Dandy's explanation lies in the ability to reproduce communicating hydrocephalus in animals. When the midbrain of a dog is enclosed by a strip of gauze which has been saturated with an irritant, adhesions form, and, acting as a barrier, they prevent the passage of cerebrospinal fluid to the subarachnoid spaces over the hemispheres. Consequently, the area in which absorption of cerebrospinal fluid can occur is limited to about one-fifth of the normal amount, and dilatation of the

ventricles results. In reality, therefore, both forms of hydrocephalus have the same origin and differ only in the locality of the obstruction. R. M. S.

- [34] **A note on the pathology of the choroid plexus in general paralysis.**—A. E. TAFT. *Arch. of Neurol. and Psychiat.*, 1922, vii, 177.

IN sections of the choroid plexus from cases of general paralysis, Taft found a progressive fibrous change, beginning with general increase of connective tissue, followed by obliteration of capillaries with formation of fibrous tufts, in which calcium salts are deposited. Finally, the capillaries disappear and the plexus becomes cystic, but the ependymal cells remain and are little changed morphologically. In view of these findings, and of the abundance of cerebrospinal fluid in this disease, Taft asks whether we are justified in concluding that the persisting ependymal cells are capable of functioning in the rôle of gland cells without the presence of the capillaries with which they normally stand in relation. R. M. S.

- [35] **The pathology of anencephaly** (*Zur Pathologie der Anencephalie*).—PEKELSKY. *Arbeiten a. d. neurolog. Institute a. d. Wiener Univ.*, 1921, xxiii, H. 2, 145.

FROM two specimens which he has studied, the author of this paper deduces that certain cases of anencephaly are due to an inflammatory process in the embryo. In the first specimen he found, in both the grey and white matter of the cord, dilated vessels and hemorrhages, the latter almost blotting out the normal picture of the cord in section. In many places collections of small round cells occurred, especially towards the periphery; the cells seemed to have passed inwards from the meninges, which were infiltrated and thickened. The most marked changes were found in the highest part of the nervous system, where the central canal opened out and there was a flat continuation of the cord. This part contained absolutely no ganglion cells, so it could not definitely be called medulla; much of it consisted of undifferentiated tissue, in which hemorrhages and small round cells abounded. The second specimen showed essentially the same features, but the medulla was distinguishable and the twelfth nucleus was present.

It is interesting that in the first case, where no medullary nuclei were present, the child breathed for fifteen minutes after birth—a fact from which Pekelsky deduces that the respiratory 'centre' does not exist as an anatomical entity.

J. P. MARTIN.

- [36] **Experimental encephalitis** (*Ueber experimentelle Encephalitis*).—POLLAK. *Arbeiten a. d. neurolog. Institute a. d. Wiener Univ.*, 1921, xxiii, H. 2, 1.

FUCHS, in 1913, produced choreiform movements in cats by guanidin, and the animals died of the intoxication and showed post mortem a general inflammation of the cerebrum. The consideration that guanidin normally produced in the body was dealt with and rendered harmless by the liver,

led Fuchs to try the effect of 'side-tracking' the liver by means of an Eck's fistula, as Pawlow had done years before for quite a different investigation. The effects were almost identical with those of guanidin feeding, but more intense, though no poison was introduced from without, the intoxication being purely endogenous.

The idea that changes in the nervous system might be produced by endogenous toxins was of course not new, but precise evidence was hard to obtain and to interpret. Such evidence as there was cast suspicion on the liver. In 1912 Wilson, in his study of progressive lenticular degeneration, had considered it probable that the changes in the brain in that condition were due to the selective action of a toxin formed in the liver or associated with hepatic disease; pseudosclerosis, too, was known to be associated in some cases with a hepatic degeneration. The work of Fuchs showed that liver insufficiency was capable, by itself, of producing nervous disease—almost certainly by endogenous toxins.

The brains and cords of the animals employed have been carefully investigated by Pollak, and the study of them forms the basis of his article. They show a general inflammation, exactly the same whether produced by guanidin feeding or by insertion of the Eck's fistula, and in no way differing from that found in encephalitis lethargica. Pollak describes these changes in detail. He first shows that they constitute inflammation, in the strictest sense of the word, all the essential pathological factors being present: he then describes separate details, laying emphasis on the perivascular infiltration with mononuclear cells, the dropping out of ganglion cells, and neuronophagia; he believes that while many of the cells found clustered round damaged ganglion cells are true glia cells, many also are blood elements derived from fine capillaries; in the subcortical ganglia he finds degenerative changes and distinct evidence of hæmorrhages; in the cerebellum there is no change, but the cord shows in a less degree the same changes as are present in the cerebrum.

This study constitutes a step towards the understanding of the relation of the liver to the central nervous system, but the encephalitis produced does not seem to be in any way characteristic.

J. P. MARTIN.

- [37] **Researches on the cerebrospinal fluid and the blood in adults with diphtheritic paralysis** (*Recherches biologiques sur le liquide céphalo-rachidien et le sang d'adultes atteints de paralysies diphthériques*).—DE LAVERGNE and ZELLER. *Bull. et Mém. Soc. méd. Hôp. de Paris*, 1921, xxxvii, 1610.

As regards the cerebrospinal fluid, observations were made on five cases and the previous results of De Lavergne were confirmed, viz., the fluid invariably shows change in albumin, cells, and sugar content. On the other hand, investigation into the question whether the fluid contained either toxin or antitoxin gave completely negative results. As regards the blood, antitoxin was invariably present, and the investigations show that this represents an active immunizing process, irrespective of whether serum had or had not been administered.

W. JOHNSON.

- [38] **The changes in cerebrospinal fluid in diphtheritic paralysis** (Les modifications du liquide céphalorachidien au cours des paralysies diphthériques).—G. L. HALLEZ. *Paris méd.*, 1922, xii, 119.

ACCORDING to certain French authors the toxins of the diphtheritic bacillus travel via the nervous elements of the peripheral nerves. For certain English authors (Orr and Rows, Walshe) the path is rather the lymphatic channels surrounding the peripheral nerves. From the numerous examinations of the cerebrospinal fluid in cases of diphtheritic paralysis, the following facts emerge. The fluid is clear, and to the naked eye normal in appearance. Its pressure is rarely increased. The Klebs-Löffler bacillus has not been demonstrated. Slight lymphocytosis is not infrequently found (occasionally up to 15 or 30 per c.mm.), but never polymorphonuclear cells. The number of lymphocytes bears no relation to the severity of the clinical paralysis. The albuminous content is always increased to a greater extent than might be expected from the lymphocyte count. This dissociation between albumin content and cells appears to be a characteristic of the meningeal reaction. The sugar content in the fluid is actually increased.

The author attributes these changes to the circulation of the toxin in the blood and to the irritation of the fluid secretory apparatus—chiefly the choroid plexuses—whereby abnormal cerebrospinal fluid is formed. No observations are so far available to show whether in cases of diphtheria, without paralysis, similar alterations in the fluid occur.

W. JOHNSON.

- [39] **Two cases of diphtheritic paralysis in adults, presenting the characters of medullary lesions** (Deux cas de paralysie diphthérique chez l'adulte, présentant les caractères des paralysies par lésions médullaires).—PIERRE MARIE and RENÉ MATHIEU. *Bull. et. Mém. Soc. méd. Hôp. de Paris*, 1921, xxxvii, 1600.

DIPHTHERITIC paralysis is too generally attributed to a peripheral neuritis. Philippe and Barbonneix have shown that the nerve centres suffer as well as the peripheral nerves. Aubertin supports this view, and points out that, in addition to the usual picture of peripheral nerve palsies, it is not infrequent to find the occurrence of partial muscle group palsies and atrophies which definitely indicate an affection of anterior horn cells. The cerebrospinal fluid, too, shows alterations due to meningeal reaction (Chauffard and Lecomte).

The two patients shown presented paralysis of accommodation, phonation, and deglutition, together with weakness of all four extremities. In the upper limbs, all muscles—flexors and extensors together with the small muscles of the hand—were affected. In the lower limbs the extensor groups were less affected than the flexor, and this was also true of the trunk muscles. The authors contrast this with the usual picture of peripheral neuritis, and term it 'the spinal form of diphtheritic paralysis'. The sensory loss in these two patients is described as of segmentary distribution. The authors regard the occurrence of this poliomyelitis as indicating a severe intoxication, while polyneuritis indicates a milder condition. In

using the term poliomyelitis, they are careful to point out that the pathological process is much less severe than in anterior poliomyelitis, and that complete recovery may be expected.

Incidentally they note the comparative frequency of diphtheritic paralysis amongst adults in recent years; but whether this is due to the more universal use of serum or to an alteration in the type of virus it is difficult to determine.

W. JONKSON.

SYMPTOMATOLOGY.

- [40] The sugar content of the cerebrospinal fluid, and its diagnostic value, especially in encephalitis lethargica.—R. COOPE. *Quart. Jour. Med.*, 1921, xv, 1.

NUMEROUS authors, especially of the French school, have reported an increase in the percentage of glucose in the cerebrospinal fluid in cases of encephalitis lethargica, as well as in other conditions affecting the mesencephalon. In a number of cases of the former disease the amount of glucose varied from 70 to 100 mgrm. per 100 c.c. of cerebrospinal fluid. This was contrasted with Mestrezat's figure of 53 mgrm.—the average of 11 cases where the cerebrospinal fluid was removed at operation prior to stavaine anaesthesia. Other observers have found the normal to be higher: von Jaksch 60 to 80 mgrm., Kraus and Corneille 80 mgrm., A. H. Hopkins 60 to 75 mgrm., Weston 60 to 70 mgrm. The variation in these results is probably due to difference in technique.

Coope examined 95 cerebrospinal fluids for glucose by the method of Folin and Wu. No normal fluids were examined. The glucose percentage in the cerebrospinal fluid of 11 cases of lethargic encephalitis varied from 54 to 94 mgrm., with an average of 74 mgrm. In 51 cases of mental disease the figures varied from 44 to 102 mgrm., and in a case of imbecility a reading as high as 111 mgrm. was obtained. On the other hand, in 12 cases of tuberculous meningitis the glucose in the cerebrospinal fluid varied from 14 to 55 mgrm., with an average of 28 mgrm., a reading above 40 mgrm. being obtained in only one case. An examination of the glucose content of the cerebrospinal fluid is therefore of value in distinguishing encephalitis lethargica from tuberculous meningitis, but it is doubtful if it gives as much information as the simpler examination of the chlorides in the cerebrospinal fluid. It would have been interesting to know to what extent the glucose in the cerebrospinal fluid varied with that of the blood, but unfortunately the latter was not examined.

J. C. GREENFIELD.

- [41] A contribution to the study of the pathological plantar reflex (Contribution à l'étude du réflexe plantaire pathologique).—L. BARBAQUER. *Revue neurol.*, 1921, xxxviii 455.

A BRIEF report of a case of hemiplegia in a boy, age 12. The onset was apoplectiform in the course of a septicemia which terminated favourably.

The nature and distribution of the paralysis and rigidity conformed to the usual type met with after a pyramidal lesion.

The plantar response on the affected side differed both from the normal and from that generally obtained in cases of this kind. Stimulation of the sole gave rise to vigorous plantar flexion of all the toes, including the hallux. The reaction developed slowly and was steadily maintained. The author comments briefly upon the variations of the plantar response met with in health and disease, without entering into a discussion of physiological theories. The paper is well illustrated by two photographs.

C. P. SYMONDS.

[42] **Some personal experiences with myasthenia gravis.**—CORIAT. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 270.

THE author reviews 18 cases which have come under his notice. He thinks mild cases are often missed, and that the disease is commoner than generally supposed. It occurs practically at all ages and in both sexes, and over 50 per cent of his cases were those of Russian Jews. The symptoms were as follows: Severe general fatigue and thickness of speech, difficulty in chewing food and swallowing (bulbar symptoms), 5 cases. Severe general fatigue with cardiac symptoms (central arrhythmia and extrasystoles), 1 case. Pure bulbar symptoms (difficulty in swallowing and chewing food, thickness of speech) without general fatigue, 2 cases. Fatigue and diplopia, 2 cases. Diplopia, ptosis, thickness of speech, difficulty in swallowing, 3 cases. Excessive fatigue and drowsiness, 1 case. Localized fatigue in the legs, 2 cases. Severe general fatigue, 1 case. Diplopia, 1 case. Double ptosis, 1 case.

Fatigue is rapid in onset and improved by rest, this contrasting with the fatigue of the psychoneurosis. The characteristic myasthenic electrical reactions were always present. The author thinks the mild cases recover, and even severe cases may have long remissions. The main criterion in treatment is rest. Biochemical tests showed a diminished creatinine excretion and an increased calcium output, which may point to a derangement of muscular metabolism.

He suggests that further investigations are required with respect to the vegetative nervous system, toxic causes, endocrine disturbances, and unconscious psychic states.

R. G. GORDON.

[43] **Peripheral facial nerve palsy** (Zur Kenntnis der peripheren Facialislähmung [mit besonderer Berücksichtigung der vegetativen Störungen]). —JALCOWITZ. *Jahrb. f. Psychiat. u. Neurol.*, 1921, xli, 55.

IN 73 cases of facial palsy, Jalcowitz found the right side affected 29 times, the left 40 times, and both sides 4 times; of 26 cases which were fully investigated, 22 were of the so-called 'rheumatic' type, i.e., no cause other than 'chill' could be assigned. In such cases the paralysis has been thought by most authorities to be due either to an inflammation of the nerve, or to pressure within the facial canal, or to a combination of these

factors : but Jalcowitz suggests that the site of the lesion may not be within the canal or at its exit, but at the nerve-endings. In support of this he mentions : (1) That when the palsy is incomplete, the muscles of cheek and upper lip are most affected, while those of the forehead, which are less exposed, may almost escape ; (2) That while the secretion of tears is frequently affected, the secretion of saliva is very rarely disturbed ; (3) That the corneal reflex not infrequently disappears on the affected side, and this he believes to be due to an accompanying peripheral lesion of the fifth nerve. He argues that, if the site of the lesion were in the bony canal, all parts supplied by the nerve would be affected equally, forehead as much as cheek, salivary glands as much as tear gland, and there could, of course, be no accompanying lesion of the trigeminal.

The author states that he has not found the absence of corneal reflex mentioned by other writers, and describes two cases in which it was noticed.

The second half of the paper is concerned with a description of the method of measuring the relative amount of tear secretion by means of strips of sterilized filter paper placed in both conjunctival sacs. Of 13 patients in whom this was done, 7 showed a disturbance of tear secretion—hyposecretion in 5 and hypersecretion in 2. Investigation of the salivary and sweat secretions did not show any changes.

J. P. MARTIN.

[41] **Narcolepsy** (Zur Kenntnis der Narkolepsie).—KAHLER. *Jahrb. f. Psychiat. u. Neurol.*, 1921, xli, 1.

KAHLER, in reporting a case of narcolepsy in a young woman of 21, states that while cases of this nature in men have been recorded frequently, only four cases have been described in women, his case making the fifth. The patients are subject to a sudden onset of sleep with a simultaneous attack of motor weakness, so that they fall down and are asleep by the time they have fallen. Attacks may occur many times in the day ; in some cases they are brought on by laughter or excitement ; the patient has no power to inhibit them. The sleep may last from half a minute or so to several hours ; it appears to be in every way natural, though in some cases the patient may be difficult to rouse, and in others if roused he may have a headache. As regards the female cases, the author emphasizes the fact that the attacks are more frequent and the sleep is of longer duration at the menstrual periods ; further, though he does not mention the point, the onset of the condition seems in the majority to have occurred about puberty.

Narcolepsy has generally been considered either to be a hysterical phenomenon or an epileptic manifestation—*petit mal* followed by sleep—though Gélinau was of a different opinion, and Redlich, Jolly, and Singer have associated it with the hypophysis.

Against hysteria Kahler notes the absence as a rule of any other kind of hysterical manifestation, the fact that the attacks are always of the same kind, that they cannot be influenced by suggestion, and that the onset of the illness is gradual. Against epilepsy there are the absence of all the usual signs of an epileptic attack, and the fact that in spite of the frequency of the attacks there has been no mental deterioration in cases

followed for many years; moreover, bromides have no influence on the condition. As regards the theory that the pituitary is involved in the causation, x-ray examination showed, in the case reported, an abnormally small sella turcica, a condition also found by Redlich and Jolly and Singer. Kahler mentions that acromegalic changes in the extremities, polyuria, obesity, glycosuria, have all been reported in different cases, but does not discuss the matter further, and only comes to the vague conclusion that narcolepsy is due to a constitutional peculiarity which causes an exhaustion of the cerebrum.

J. P. MARTIN.

- [45] **Studies in familial neurosyphilis: (1) Conjugal neurosyphilis.**—J. E. MOORE and A. KEIDEL. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 1.

A SUMMARY of the results of examination of the 52 marital partners of 50 neurosyphilitic patients. In each case, in addition to a careful anamnesis and clinical examination, special attention was paid to the laboratory investigation of the blood and spinal fluid. Of the whole group of 52 partners, 40 were syphilitic; and of these, 21 had neurosyphilis. In the group of 22 meningovascular syphilites, 18 partners had syphilis; but of these, only 6 were neurosyphilitic. Of the 22 partners of 20 cases of general paralysis, 16 had syphilis; and of these, 11 were neurosyphilitic. Six of the 8 partners of tabetics had syphilis; and of these, 4 had neurosyphilis. The type of conjugal neurosyphilis was similar in both partners 8 times. In 7 instances neurosyphilis was asymptomatic in the marital partner, and was only detected by routine examination of the cerebrospinal fluid. From the material available the authors do not feel qualified to give definite conclusions regarding the existence of a neurotropic strain of *Spirocheta pallida*.

R. M. S.

- [46] **The diagnostic value of exophthalmos** (Valeur sémiologique de l'exophtalmie).—F. TERRIEN. *Paris méd.*, 1922, xii, 33.

TRUE exophthalmos must be distinguished from the pseudo form which occurs in myopia (more especially when this is unilateral), in glaucoma (infantile form), in retraction of the lids, and in obesity. Weakness of the orbicular muscle (in facial paralysis), and a plethoric state of the veins of the head, are also a cause of pseudo-exophthalmos. Clinically the author finds it useful to measure the degree of exophthalmos by means of a simple mechanism—the ophthalmometer.

The direction of the exophthalmos—whether median or lateral—may provide valuable diagnostic evidence. Similarly, the reducibility or otherwise of the protruding globe should be investigated. Diplopia is not invariably complained of—more particularly is this so when the condition has been one of slow development. Diplopia as a symptom is more marked when the eye displacement is only slight. Careful examination of the fundus oculi and of the accessory nasal cavities should invariably be undertaken, as evidence of supreme significance may be obtained by such means.

Two groups of exophthalmos are to be recognized: (1) That due to relaxation of some portion of the musculature of the eye (the recti muscles act as retractors and the obliques as protractors of the globe); and (2) That due to lesions involving the walls of the orbital cavity.

Group 1 contains the more usual forms of exophthalmos—where the condition is, as a rule, bilateral—such as occurs in paralysis of both third nerves, irritation of the cervical sympathetic, and Graves' disease. In the first of these we have a globe which is almost immobile; in the second the exophthalmos is accompanied by dilatation of the pupil and a widening of the palpebral fissure; whilst in the third the other symptoms of the disease are present.

Group 2 contains most of the forms of unilateral exophthalmos. They are due to either: (a) An increase in the contents of the orbit, or (b) A decrease in the size. The latter is seen in hydrocephalus, rickets, and tumours of the orbital wall; the former is a common cause, and includes various inflammatory conditions (involving Tenon's capsule, intra-orbital cellular tissues, orbital bony walls, and the neighbouring sinuses). Of non-inflammatory conditions there are emphysema (sudden onset) and tumours (slow onset). The latter first cause protrusion of the eye, then oedema, and finally limitation of movement together with congestion of blood-vessels. They may be solid tumours, cystic, or pulsatile. In the pulsatile form, ligature of the common carotid should be undertaken if compression of this vessel has first shown that improvement will occur.

W. JOHNSON.

- [47] **A syndrome of symmetrical ataxia of the fingers in medullary lesions** (Sur un syndrome d'ataxie symétrique des doigts au cours d'affections médullaires).—VERGER and GREINER DE CARDENAL. *Jour. de Méd. de Bordeaux*, 1921, xcii, 211.

ATAXIA is as well known, though less common, in the upper limbs as in the lower. The kinæsthetic sensations (cutaneous, joint, and muscle senses) may be affected in peripheral nerve lesions, tabes dorsalis, mid-brain, cerebellar, and cerebral lesions (e.g. post-hemiplegic ataxia and parietal syndrome ataxia). In the first two forms the condition is usually bilateral and toxic in origin. In the remaining forms the cause as a rule is a focal lesion, producing a unilateral ataxia.

The spinal form of ataxia (tabes) offers a distinct difference from the cerebral form (parietal cortex lesion). In the former the whole limb is affected and the ataxia appears chiefly in the grosser movements. In the latter, it is often so slight as only to constitute a little awkwardness when the finer movements are attempted—as in buttoning the collar, striking a match, pinning one substance to another, etc. Further, all grosser movements of the limb are passably done, while the stereognostic sense is defective.

The authors proceed to give details of four cases of lesions in the medulla which presented an ataxia of the fingers closely similar to that of cerebral origin. The etiological factor was not the same in each case (syphilis, lethargic encephalitis, and antirabitic serum being the probable causes).

The patients presented bilateral ataxia of the fingers, together with paraplegia and loss of sphincter control. The unlikelihood of a bilateral cortical lesion is pointed out, and the authors accordingly place the lesion in the medulla or mid-brain.

W. JOHNSON.

- [48] **Syndrome of complete section of the dorsal region of the spinal cord** (Syndrome de section complète de la moelle dorsale datant de 10 ans).—LHERMITTE and PAGNIEZ. *Presse méd.*, 1922, xxx, 57.

THE syndrome of transection of the spinal cord has been considerably elaborated and elucidated by the experience of neurologists during the war. In those instances where the cord below the level of the lesion remains intact, evidences of its vitality soon appear. The early stage of abolition of all reflexes gives place to one in which the cutaneous, deep, and visceral reflexes become re-established in orderly sequence and the muscles do not undergo atrophy. Where, on the other hand, the cord below the level of the lesion is severely damaged, the second stage is only partially, if at all, entered on, and wasting of the muscles is marked, whilst the condition of the bladder and rectum is that described under the term 'automatic'. The case the authors record is of the latter variety.

The patient, a boy, 13 years of age, when three years old sustained a spinal injury resulting in paralysis of both lower limbs. The highest level of the site of trauma, as judged by the sensory loss, is the sixth dorsal segment. A good clinical description is given, including observations on the blood-pressure and temperature of the paralyzed limbs, but the chief interest of the case lies in the observation regarding the growth of the bones in the paralyzed lower half of the body. The length of the bones in the legs is the same as that found in a normal child of the same age. A-ray examination revealed the diaphyses to be practically normal. Accordingly it must be conceded that skeletal growth occurs independently of the so-called trophic influence of the spinal cord. This is supported by the few cases of anencephalomyelia which have been recorded. The fact that defective growth occurs in a limb suffering from acute anterior poliomyelitis, the authors would attribute to the inflammatory and toxic nature of the virus.

In conclusion, they suggest that the sympathetic nervous system and the centres for vascular tonus are the factors chiefly associated with the growth of the skeleton, at the same time admitting that too little is known on this subject for any definite opinion to be formed.

W. JOHNSON.

TREATMENT.

- [49] **Pressure changes in the cerebrospinal fluid following intravenous injection of solutions of various concentrations.**—J. H. WEED and P. S. MCKIBBEN. *Amer. Jour. Physiol.*, 1919, xlviii, 512.

IN an attempt to determine whether an increased amount of salt could be detected in the cerebrospinal fluid, following intravenous injections

of hypertonic solutions of sodium chloride, it was noted that within a short time after the intravenous injection cerebrospinal fluid could not be obtained when the subarachnoid space was entered. On attaching a manometer, it was found that the pressure of the cerebrospinal fluid could be altered very rapidly and very definitely by intravenous injections of solutions of various concentrations. Intravenous injections of Ringer's solution caused no lasting change in pressure. Distilled water given in a similar manner caused a marked and sustained rise in cerebrospinal-fluid pressure (an increase from 130 to 285 mm. of this fluid). Hypertonic solutions of concentrated sodium chloride, sodium bicarbonate, sodium sulphate, and glucose led to an initial rise in the pressure of the fluid, followed immediately by marked fall in this pressure, often to below zero.

R. M. S.

[50] **The effect of salt ingestion on cerebrospinal-fluid pressure and brain volume.**—F. E. B. FOLEY and T. J. PUTNAM. *Amer. Jour. Physiol.*, 1920, liii, 465.

AN extension of the experiments of Weed and McKibben, who showed that it is possible to reduce cerebrospinal-fluid pressure, and diminish the bulk of the brain, by injecting hypertonic solutions into the blood-stream. Using cats for their experiments, Foley and Putnam found that the introduction of hypertonic salt solutions into the gastro-intestinal tract had a similar effect; 20 to 30 c.c. of a 30 per cent sodium chloride solution introduced into the duodenum or the rectum of an average-sized cat produced a maximal fall of cerebrospinal-fluid pressure. Following such doses the average fall of pressure in a large series of experiments was 250 mm. of water; larger doses added nothing to the extent of the fall. Following the fall there was a gradual rise in pressure, and seventeen to forty-eight hours after such injections four animals showed pressures averaging 45 mm. less than that in the average animal. When sodium chloride in only slightly hypertonic concentration was employed, a fall in cerebrospinal-fluid pressure was still obtained, but larger doses were required. Sodium sulphate, which is not absorbed from the gastro-intestinal tract, produced qualitatively similar results, but less in extent, and at a slower rate; with concentrated dextrose solutions the fall was still less. The changes in cerebrospinal-fluid pressure were shown to be independent of changes in arterial or venous blood-pressure, and were accompanied by a decrease in the size of the brain.

The authors conclude that the pressure values obtained after salt ingestion are not due solely to changes in brain volume and capacity of the cerebrospinal-fluid spaces, but primarily represent new ratios between secretion and absorption of cerebrospinal fluid.

R. M. S.

[51] **Clinical uses of salt solution in conditions of increased intracranial tension.**—F. E. B. FOLEY. *Surg. Gynecol. and Obst.*, 1921, xxxiii, 126.

THE work of Weed and McKibben on pressure changes in the cerebrospinal fluid following intravenous injection of hypertonic saline prompted

Foley to investigate the clinical use of this procedure in the human subject. It was found to possess a definite field of usefulness in cases exhibiting high grades of intracranial pressure, and the response which follows this line of treatment is conditioned by the size of the lesion which increases brain bulk and the amount of fluid available for absorption, the induced fall of cerebrospinal-fluid pressure being inversely proportionate to the former and directly proportionate to the latter. The most striking results are to be obtained in those cases in which cerebrospinal-fluid obstruction exists. Thus, in cases of internal hydrocephalus in which the cerebrospinal fluid is shut off in the ventricular system, marked benefit follows the administration of hypertonic saline, the fluid being actually absorbed within the ventricles. In the case of very extensive tumour growths the perivascular and other fluid-containing spaces of the brain are probably collapsed, and little can be expected from this line of treatment. Not only does the administration of salt give temporary freedom from pressure headaches, but it permits more exact clinical observations to be made, and by diminishing tension makes the work of the anaesthetist and operating surgeon less difficult.

R. M. S.

[52] **New views and new treatment of epilepsy** (Nouvelles conceptions et nouveaux traitements de l'épilepsie).—J. TIXEL. *La Médecine*, 1922, iii, 366.

THE somewhat contradictory facts provided by clinical and experimental observation in epilepsy may be brought together if one discards modern views. The author regards the disorder as a phenomenon of cerebral inhibition rather than of excitation. The essential factor in the epileptic seizure is the temporary loss of function in the highest brain level. The occurrence of rigidity, tonic and clonic spasms, exaggerated deep reflexes, and Babinski plantar reflex is evidence of the unchecked activity of the automatic centres in the lower brain levels (Hartenberg). The terminal convulsions in meningitis and asphyxia are probably due to a failure of cortical control. Ischemia of the cerebral cortex is a recognized cause of fits. In animals where artificial fits have been produced, removal of the cortex does not lead to cessation of the attacks.

Wilson's work on decerebrate rigidity has shown that lesions in man which interfere with connections between the cortex and the mid-brain produce a position of opisthotonus similar to that produced by Sherrington in monkeys.

It appears therefore that the pallor of the face and the spasm of the retinal arteries, which occur in epilepsy, should be regarded as a portion of a more general cerebral arterial spasm producing ischemia of the cortex—this being the cause of the epileptic attack. Local cerebral trauma produces a generalized fit as frequently as a pure Jacksonian attack. Such trauma acts as a local irritation: but underlying every case, it is submitted, there is the additional factor of general arterial spasm. Syphilis, lead, alcohol, ergot, and other poisons—not forgetting glandular and alimentary—may be the cause. The poisons of eclampsia and Bright's disease are

also powerful factors in the production of arteriospasm. The rôle which glandular disturbance may play is shown by the cases where fits disappear at puberty and re-appear at the menopause. In some cases of epilepsy the intoxication appears to be of the same nature as anaphylactic shock. The marked fall in the leucocyte count and the sudden drop in the blood-pressure before an attack suggest this. The substance to which the patient is sensitive may be exogenous (food) or endogenous (auto-intoxication). Tinel and Santenoise have shown the existence in their patients of alternating periods of sensitiveness and immunity (or insensitiveness). The sensitive period is one of sympatheticotonia. The beneficial action of luminal is probably due to the modification of the vagotonic state and to a tendency to production of the sympatheticotonic state.

Some light is thrown on the treatment in epilepsy by these conceptions of cortical inhibition, arteriospasm, and anaphylaxis. Efforts to prevent or minimize vasoconstriction of the cerebral vessels (such as by extirpation of the cervical sympathetic or the suprarenal gland) have produced no definite results. The fact that the fits disappear during acute infectious illnesses, and after injection with such sera as antidiphtheritic and antirabietic, or injections of tuberculin and antivenin, suggests that the more hopeful method may be by protein therapy. Some results have already been reported after injections of peptone and milk, but they have been inconstant and unreliable.

As regards drugs, gardenal acts by suppressing the vagotonic state, whilst the bromides and potassio-borico-tartrate act by lowering the excitability of nerve-cells. Hartenberg used large doses of strychnine in the hope of overcoming the state of cortical inhibition, but his results were only temporary. Doses of two to five minims of liquor strychninae, however, are said to be often beneficial in petit mal, and its use may be alternated with that of caffeine, which has a similar pharmacological action.

W. JONSSON.

Psychopathology.

PSYCHOLOGY.

- [53] Death psychology of historical personages.—R. MACDONALD.
Amer. Jour. Psychol., xxxii, 4.

This is an analysis of a summary of last words of distinguished people. The author points out that three kinds of psychologic deaths should be differentiated: (1) Where there is little or no delirium, and intelligence perseveres, to the end becoming very acute; (2) When the mind is in a mixed state between reason and delirium; (3) Where there is loss of consciousness with delirium.

The general consensus of opinion appears to be that the dreadfulness of death and its physical pain are for the most part imaginative. The

analysis is given in tabular form, showing the profession and number of persons, average age, manner of deaths (subdivided into death by violence and by disease), painful and painless deaths, and so forth.

The second part of the table deals with the mental states of the dying persons, and shows the respective numbers who have spoken words indicating various moods. The general results may be quoted as follows: Persons of religious profession show the largest number. The great majority of men who become eminent must live at least fifty years. Royal and military personages show the lowest average age, owing to the large number of deaths by violence, which partly affects also the religious people, statesmen, and women. Apart from the factor of death by violence, it is seen that poets and artists die the youngest. Pain at death appears of relative unimportance. About 17 per cent were sarcastic or jocose—indicating a high degree of mental control. More than twice as many were contented than were discontented, according with the figures showing absence of pain. Statesmen and women used many more words than the other classes.

R. DANCIE.

[54] **The nature and development of the sentiments.**—CHARLES S. MYERS. *Psyche*, 1922, ii, 196.

HAVING pointed out that A. F. Shand was the first to apply the term 'sentiment' to certain large mental systems, particularly love and hate, Dr. Myers proceeds to show how McDougall has amplified this work more particularly in regard to the psychical origin and physiological concomitants of the sentiments. McDougall regards the sentiments as *tendencies* to experience emotions, but Myers is unable to accept this view. He regards 'love' and 'hate' as indicating definite feelings. In considering the origin of the sentiments, he cannot accept McDougall's contention that the 'rudiment' of a sentiment may be "formed by the association of a single emotional disposition with the idea of some object".

Sentiments may unquestionably be innate. The rudiment of the sentiment feeling of love is compared with the innate feeling of positive interest which an animal has for its young. The special interest becoming attached to a specific object when a single emotion is repeatedly attached to it, is a 'rudimentary sentiment'. The author believes that any particular sentiment is fundamentally the same, though modified profoundly in different individuals. A rudimentary sentiment involves a specific feeling and has an affective origin; it is not a mere psycho-physiological structure or disposition to any single emotional feeling. The complete evolution of a sentiment requires the full development of free ideas: the rudimentary sentiment may be compared with the dislike of an animal or young child for any object. All grades of sentiment feeling are recognizable. Sentiment feeling develops to maturity in connection with the emotions belonging to its system, but cannot be identified with its emotional systems.

Drever is mistaken in calling a phobia a 'simple sentiment'. The relatively uncontrolled characteristics of the phobia are the distinguishing marks of the complex. The author agrees with Rivers' view, that

the complex differs from the sentiment in being a 'suppressed body of experience'.

The foundation of the sentiment is found in the affective appeal made by the object to the subject's attention. It may, as Shand has illustrated, develop new feelings within its system, and is modified by the emotion coming within its sphere. The function of the sentiment is to prevent disorderly action of the emotions, just as the emotions prevent disorderly appearance of instinctive activities.

ROBERT M. RIGGALL.

[55] **A new theory of laughter.**—WILLIAM McDougall. *Psyche*, 1922, ii, 292.

THE author discusses the inadequacies of all the theories, and illustrates his remarks by quoting from those of Spencer and Bergson. Spencer stated that laughter affords an outlet for surplus nervous energy, escaping by the motor nerves in most frequent use, those supplying the muscles of speech and respiration. This theory is inadequate, because laughter occurs independently of this escape of energy. Bergson states that the essential function of laughter is disciplinary. Professor McDougall points out that this theory no more covers the essential facts of laughter than Herbert Spencer's. They both fail to answer the question, For what end did the human species acquire this capacity for laughter? Laughter is a highly complex co-ordinated series of movements, maintained by an impulse so strong and definite that it often defies the control of the will. The author proceeds to consider the conditions which excite laughter and the condition of laughter itself. Laughter interrupts the train of mental activity; it diverts or rather relaxes the attention, and so prevents the further play of the mind upon the ludicrous object. So powerful is laughter to interrupt conative process, that its more intense degrees arrest well-practised and habitual bodily actions: and the hearty laughter collapses, temporarily incapacitated for all mental or bodily activity. Secondly, the bodily movements of laughter hasten the circulation and respiration, and raise the blood-pressure: and so bring about a condition of euphoria which gives a pleasurable tone to consciousness.

Professor McDougall does not think that laughter always expresses pleasure: he thinks that laughter has been wrongly regarded as the normal expression of pleasure or the more intense degree of the feeling which is expressed by the smile. This he states is unquestionably the normal expression of pleasure. Although admitting that we are often pleased when we laugh, he contends that the things we laugh at are essentially displeasing, and that they would, in point of fact, displease us if we did not respond with laughter, inasmuch as they consist in the minor defects, mishaps, and misfortunes of our fellows. Laughter is primarily and fundamentally the antidote of sympathetic pain. The capacity of laughter has been acquired by the individual as a protective reaction against all the minor pains of his fellows.

In summing up, Professor McDougall states that laughter is an instinctive reaction of aberrant type. The objects which primarily excite

this instinct are such actions, situations, and aspects of human beings as would excite in us some sympathetic pain or distress, if we did not laugh. The biological function of laughter is defence of the organism against the many minor pains to which man is exposed by reason of the high sensitivity of his primitive sympathetic tendencies. This defence is achieved in two ways: first, the arrest of the train of thought; secondly, the bodily stimulation resulting from laughter.

ROBERT M. RIGGALL.

[56] **Psychology and psychotherapy.**—WILLIAM BROWN. *Jour. of Ment. Sci.*, 1922, lxxviii, 23.

IN this important paper the author devotes himself to a critical review of the modern theories of psychology and psychotherapy. He points out the difficulty obtaining in all psychological work as opposed to the investigations carried out in other fields of scientific research, that it is practically impossible to apply any strict standards of measurement to the processes of the mind, and that, consequently, the vital test of verification cannot be satisfied in regard to the various hypotheses and theories which underlie some of the modern conceptions of the mind.

In his opinion psychological knowledge must be brought into accord with the facts observed along the two broad avenues of natural investigation, in both of which the mind finds an integral place, and between which it forms the connecting link. On the one hand there is the field of biology, where the mind is to be considered as embodied and in relation to the physical organism; on the other, depending on the fact that the mind is fundamentally the instrument of all knowledge, there is the field of philosophy, and in regard to this latter the author insists that whatever system of ethics or of philosophy may be held, there must be assumed an insight into moral values which grows in the course of life. Any theory, therefore, which ignores the basic features of either biology or philosophy must be examined with scrupulous care before it may be used indiscriminately as a method of treatment.

Dr. Brown then deals at length with the theory and the method of psycho-analysis, his main criticism being directed towards the psycho-analytic hypothesis which sets out to explain both the method of free association and the results which are obtained by its aid. "Great as is the value of these theories for psychopathology, blind unmerited adherence to them on the part of inexperienced disciples is wholly detrimental to the science."

To his mind the problem of the relation of suggestion to psycho-analysis goes right to the heart of the difficulty, and he develops his argument showing how the factor of suggestion must inevitably enter both into the theory of the causation of the morbid states and into the method of free association used to elucidate and treat them. As regards the method, he contends that there are two desiderata aimed at for the successful prosecution of an analysis which are ultimately based upon the factor of suggestion, and whose *raison d'être* can only be found in the processes involved in the action of suggestion. In the first place suggestion as a form of treatment *per se* can be applied formally by the placing of the

patient in an attitude of relaxation combined with the assumption of a mental state involving the abeyance of the will in regard to the conscious determination of the thought processes, and this mental and physical attitude is that necessary to the course of the analysis. Secondly, suggestion may be applied informally by the establishment of a certain relationship between the physician and the patient, and the establishment of the so-called transference is again an integral part of the analysis. Bearing these considerations in mind, therefore, it is clear that the Freudian hypothesis which eliminates entirely the factor of suggestion in its explanations must be viewed with scepticism.

The author finishes with an appeal for the bringing to bear of a more general philosophic outlook in the treatment of cases, so that the patient may have a reliable and sound 'autognosis' upon which he may rebuild his personality.

T. B

NEUROSES AND PSYCHONEUROSES.

[57] The nature of functional disease.—WILLIAM McDougall. *Amer. Jour. Psychiat.*, 1922, i, 335.

McDouGALL deplors the widespread and deeply-rooted prejudice existing against the more modern conception of functional disorder which has hindered the development of psychiatry, and especially so in England. He sees herein an aspect of the philosophical problem of structure versus function. The biological advances of the nineteenth century became dominant and popular, and seemed to settle the question in favour of structure. Other late discoveries seemed to confirm the point, so that research turned almost wholly to attempts to discover defects of brain structure in all mental disorder. Though some good results have accrued for psychiatry, it has been a period of stagnation. Thus organic neurologists and organic psychiatrists have existed, while the neuroses were neglected by all with a few distinguished exceptions. Through the influence of the war, which produced such an immense number of severe neuroses, and through the work of the psycho-analysts, such a state of affairs is being rapidly abolished. The claim of functional disorder to a place of equal importance with the organic disorders must be fully recognized. The human organism has to work under varying environmental conditions, and functional disorder arises when the environmental changes demand adjustments which exceed the organism's power of self-regulation. Purpose implies mind or mental activity, and such operations go on on very different planes of consciousness. Functional disorders are commonly the expression of subconscious purposes, or of the harmony of conflicting purposes which may be wholly or in part subconscious. It is therefore through mental influences that functional disorders are brought about; that is to say, they are psychogenic. In the emotional disturbances of the more chronic kind we tend to dwell on the bodily changes, losing sight of the essential fact that the mental change was the primary condition. It is in relation to the psychoses that psychogenesis is of greatest interest, and in dementia præcox the problem presents itself most definitely. Jung and

David Forsyth are quoted as arguing forcibly in its favour, while Mott's deductions from his pathological work are severely criticized, McDougall giving evidence to show that Mott is blindly prejudiced to obvious facts. Exophthalmic goitre is taken as a good illustration of how emotional shock may bring about functional disturbance followed by organic changes. Cannon's work on the endocrines is quoted in confirmation. In such cases mental treatment may be the most essential and effective means towards cutting short the organic disorder. McDougall thinks we are justified in looking for functional origins in manic-depressive and epileptic insanities, and thinks that the most fundamental working conception for psychology must be purposive activity.

An excellent paper is concluded with the statement that "mind has a nature and a structure and functions of its own which cannot be fully and adequately described in terms of structure of the brain and its physical processes".

C. S. R.

[58] **Some aspects of the war neurosis.**—G. H. FITZGERALD. *Brit. Jour. Psychol. (Med. Sect.)*, ii, 109.

FITZGERALD reviews his experience with the 'war neurosis' in the light of Freud's recent contributions to psycho-analysis, viz., narcissism, and *Jenseits des Lustprinzips*. Those cases where the constitutional factor is negligible and the breakdown is manifestly caused by the unparalleled ordeal of modern warfare are explained as due to the threat to the ego being so great as to throw the patient back to the position of an infant. This accounts for his deep-rooted sense of injury and injustice, and his desire that others should occupy themselves exclusively with his well-being. The regression motive is frequently seen in the dream, particularly in the recurring dream. Such dreams, which are often exact reproductions of the traumatic moment, are repeated even after the affect of the original event has been abreacted. It would thus seem as if the unconscious were powerless to deal with them, and as if the dominance of the pleasure principle was here mastered by the compulsion to repeat. Fitzgerald asks whether in the light of Freud's recent work the underlying motive in this 'widerholungsang' may not be regarded as an attempt to gain mastery of the incident by repeated abreaction. In an overwhelming trauma all the defence mechanisms are gathered at the point to form a counter-charge of energy, which serves to bind the incoming stimulus. The dreams following an overwhelming shock seek to achieve mastery of the excitation by the development of anxiety, and may be regarded as attempts at cure. Abreaction therefore seems to be effective in so far as it aids the fixation process by the deliberate production of 'Angst' against which the patient has opposed the resistances of the (conscious) ego. A physical injury received at the same time as the shock prevents the development of a traumatic neurosis by means of a narcissistic conversion, but as this transference weakens with the healing of the wound, a neurosis may develop. The resistance against cure must be regarded as an effort to protect against the results of the release of energy from its satisfactory fixation.

ALFRED CARVER.

[59] A case of psychasthenic delirium.—PIERRE JANET. *Amer. Jour. Psychiat.*, 1922, i, 319.

IN his well-known graphic way, Janet gives a clinical description of a case he had followed without interruption for over sixteen years, to demonstrate the transition from an obsessional state to a deliriant condition. He endeavours in conclusion to throw some light on the solution of the problem.

The patient, now a woman of 36, had a very psychopathic family history, but apart from chronic stomach trouble seemed fairly normal until the age of 20, when, after the death of a sister, she showed symptoms of psychasthenia. She became constantly sad and worried, readily cried, and was dreamy and idle, but at other times would be restless, talked loudly of her tormenting remorse, but did nothing useful. Full of scruples and self-accusations of all sorts, she expressed the feeling that she knew what was right but had not the will-power to do it. Though wishing for advice and help, she felt she must struggle against others as well as herself, and though lacking initiative must do something wonderful to rid herself of her condition. She thought she was never clean, that she was constantly soiling herself, while her gravest fears centred round her modesty, and she felt her brain crowded with obscene and tempting sexual thoughts. These were, however, only obsessional thoughts, and no appropriate acts followed. She was for ever vacillating between statements of guilt and having done her best. From the age of 20 this state has constituted her normal life, but at three different periods of time, for five months, eighteen months, and two years respectively, she passed into a condition of delirium. She then puts into violent execution, and affirms, with the most positive conviction, all the ideas which previously she presented in the form of obsessions accompanied with hesitation and doubt. She starts actions of devotion which become absurd, cries out that she must impose her will over others, and fights for days and nights. She imposes privations upon herself, and gives herself the most filthy tasks to perform. The very ideas which were formerly repugnant to her, and of which she spoke with fear, are now those which she furiously puts into execution. She is now surprisingly vulgar and incredibly obscene. Revolting scenes are enacted night and day for as long as two years.

How can such a delirium be classified? There is no question of dementia or mental confusion. Her elementary intelligence is retained, and her acts are accompanied by at least apparent reasoning. In her lucid intervals all her past memories are fresh in her mind. The psychological characteristics of periodical manic states are not discovered here, even though this patient for weeks would be sad and depressed. There is none of the joy of the manic, but rather is she sad in thinking over all she believes she must do. She has not lost the faculty of desiring, believing, and willing, as found in melancholias. Both her forms of behaviour in her two phases are marked by voluntary action and belief, but at a different psychological level. Janet then states that will and belief consist essentially in a binding together of the spoken word and movement. There may be *immediate assent* as in suggestion; but at a higher level there is *reflective assent*, which expresses the average force of all the tendencies of

the whole mind which is the starting-point of reality. It is the operation of reflection upon which all the disease of the psychasthenie rests. They seem to reason passionately, but cannot reach conclusions. It is this disease of reflection, this difficulty to apply a reflective decision, which characterizes the first phase of this patient. The deliriant stage demonstrates the falling to a lower, more primitive level of psychological tension, in which reflection is completely suppressed and the patient gives immediate assent without hesitation, regret, or control. A delirium of this kind may play a considerable rôle in the delirium of persecution, and, where the depression sinks still deeper, we become involved in the problem of dementia præcox.

C. STANFORD READ.

PSYCHOSES.

[60] **Essential limitation and subdivision of idiocy on a comparative-psychological basis.**—II. DE JONG. *Jour. Nerv. and Ment. Dis.*, liv. 1.

THE author commences by investigating the behaviour of a four-year-old microcephalic idiot, and found that this corresponded to what is known in animal psychology as non-ideational behaviour. He describes his experiments on this and other patients at some length, and obtains the following results:—

As in neurology comparative anatomy is applied, in the same way the application of comparative psychology in psychiatry gives good results. This comparative psychological method gives a means of investigation without language. In this way I discovered the lowest form of oligophreny which is characterized by its lack of power of understanding. The representatives of this group are, as far as their behaviour toward their environment is concerned, comparable to sub-anthropoid animals. When we call this group idiocy, we make a distinction between idiocy and imbecility which is based on essential and qualitative features, and not on gradual and quantitative differences, as was the case till now.

In the experiments the possibility of imitation without understanding which had already been observed in animal psychology was again stated. The attention could be divided into essential and primitive attention—the former for new, the latter for stamped-in mechanisms.

The group which has been called idiocy can be divided into three degrees, with the following features:—

Idiocy of the first degree: attention positive, power of imitation positive, power of understanding negative.

Idiocy of the second degree: attention positive, power of imitation negative, power of understanding negative.

Idiocy of the third degree: essential attention negative, power of imitation negative, power of understanding negative.

The features of imbecility are: attention positive, power of imitation positive, power of understanding positive. The different degrees of imbecility (and of debility) are characterized by gradual differences in the

power of understanding, and form quantitatively different modifications of a qualitative complex which is identical with the normal human intelligence. The work of Stern moves in this domain.

Part of the mutes and deaf-mutes appear to be of the group of the imbeciles.

In this way therapeutic possibilities are given for this group. They appear to respond to normal human learning methods. The way of learning of the idiots is that of trial and error. In some of them this can be combined with power of imitation without understanding. In this way of learning, certain objects or sounds get a certain 'meaning' which gives rise to a selective reaction. This can perhaps be adapted in teaching them simple work which can be carried out without intelligence, and to react in some way—without understanding naturally—to the spoken word.

R. G. GORDON.

[61] **Acute psychoses with symptoms resembling dementia præcox.**—

THEODORE A. HOCH. *Amer. Jour. Psychiat.*, 1922, i, 365.

THE psychotic picture is subject to considerable variation in its evolution which is dependent partly on the causative agent, partly on environmental factors, and is occasionally altered by emotional happenings. Under the stress and strain of war-time conditions, men developed psychoses with the symptom-complex of dementia præcox; yet they made unexpected recoveries on their returning to their normal environment. Dementia-præcox-like reactions frequently confuse the picture in an acute psychosis. The difficulty in making a diagnosis is especially great in early and atypical cases of dementia præcox and manic-depressive insanity. The mere presence or absence of hallucinations or delusions does not speak for or against dementia præcox. The actual content of the delusional idea may be of less significance than the mechanism back of it. Even the personal history may carry us astray. Where dementia-præcox traits are of sufficient prominence to suggest themselves in an early diagnosis, a guarded prognosis is indicated. In passing judgements on types of conduct and reactions which suggest dementia præcox, it is necessary for us to inquire into types of reactions and adjustments which the individual made in his normal prepsychotic period. So often our impressions that a certain case will not do well are founded upon traits which superficially appear to belong to the præcox group, but searching analysis later reveals them to be but atypical reactions depending on factors in the upbringing, environment, the inherited make-up, and beliefs and superstitions. A few brief case histories are given, illustrating the difficulties in diagnosis and prognosis the writer speaks of.

C. S. R.

[62] **Dementia præcox and syphilis.**—RANSOM A. GREENE. *Amer. Jour. Psychiat.*, 1922, i, 399.

SYPHILIS as a causative factor in relation to insanity is not believed to have any relation in this respect to dementia præcox, though Kraepelin states that it is common in this disease. Out of 495 cases of dementia præcox investigated by the author, only 12 were found to have positive

Wassermann and negative spinal fluid. Some of these might come within the group described by White and Jelliffe as syphilitic psychoses simulating paranoid types of dementia præcox. In none of the cases did there appear, at any time, any suggestion of mental aberration characteristic of the neurosyphilis. The evidence is definite that we must not rule out possibility of neurosyphilis because our patients are apparently dementia præcox. On the other hand, we may not always find that clinical and neurological evidence of tertiary nerve syphilis is to be relied upon if we are to use the spinal-fluid findings for a criterion. C. S. R.

[63] **Chronic bacterial infections in cases of dementia præcox.**—
W. FORD ROBERTSON. *Jour. of Ment. Sci.*, 1922, lxxiii, 8.

THE author here presents the results of an inquiry into the possible importance of chronic bacterial infections as a factor in the causation of dementia præcox. For the purpose of the inquiry he studied, by appropriate bacteriological methods, the intestinal flora in thirty-two early cases of dementia præcox, in as many cases of other forms of acquired insanity, and in some three hundred cases of nervous and other disorders of the general population.

Every case of dementia præcox investigated was found to be suffering from serious bacterial infection particularly involving the intestinal tract, and though the infections were not special to this disorder, each having been found in many other mental and nervous conditions, yet they were all associated with neurotoxic manifestations, and were all such that their presence was incompatible with health.

While the infections in all cases of dementia præcox were mixed, three main types were distinguished in which the dominating organisms were, respectively, the pneumococcus, the neurotoxic diphtheroid bacillus, and the anaerobic streptothrix types. The most important associated infections were by the *Streptococci pyogenes* and *anginosus*, the Friedländer bacillus, staphylococci, influenza bacilli, and anaerobic strains of the *Micrococcus catarrhalis*.

Illustrative cases are quoted, and the author gives as his conclusion that these chronic bacterial infections are the most important of several factors that determine the mental disorder. Every form of bacterial infection shows a wide range of effect in any group of individuals: differences in the inherent resistance of the patient colour the clinical picture produced by the bacterial attack. In dementia præcox this defective resistance would appear to be especially on the part of the nerve-cells of the most highly developed areas of the brain, namely, the association centres.

Basing his remarks on the results he obtained by employing methods of therapeutic immunization against the particular organisms he has isolated in each particular case, the author concludes by stating his conviction that "it is along such lines that a great measure of control will be established over the large group of the acquired forms of mental disease, which includes dementia præcox, acute insanity, and the affective psychoses."

T. B.

- [64] **The prognosis of involution melancholia.**—AUGUST HOCH and JOHN T. MACCURDY. *Arch. of Neurol. and Psychiat.*, vii, 1.

THIS article is based on observations made by the late Dr. Hoch on 108 cases of involution melancholia between 1895 and 1905. They are now summarized by Dr. MacCurdy in the light of a work by Dreyfus which appeared in 1907. Dreyfus contended that a great many cases of involution melancholia, whose condition had been considered irrecoverable, finally recovered, although the favourable outcome might not appear for almost ten years. Moreover, he found that many gave a history of former attacks, and some passed from melancholia into a manic phase. The behaviour of the psychosis was therefore the same as that of the recognized forms of manic-depressive insanity. Dr. MacCurdy attempts to substantiate this with the material of Dr. Hoch's observations. Of the 67 cases tabulated, 43 are classified as recovered, 20 as chronic, and 4 as doubtful cases. In general he regards the features common to the recovered cases as benign. They are: (1) Marked emotional reaction; (2) Anxiety with restlessness; (3) Delusions of death and poverty (most common). Peevishness and hypochondriasis are never outstanding features of this type. The average duration before commencement of recovery was nine and a half months. The average total duration was twenty and a half months.

He applies the term malignant to the features common to the 20 chronic cases. In them the frank fear reactions of the recovered cases are replaced by whining, moaning, and seclusiveness. The three malignant features are: (1) Peevishness; (2) Hypochondriacal ideas; (3) Restriction of interest or affect. One or all three of these features is found in all the chronic cases.

It will thus be seen that the features common to the recovered cases approximate to those which we associate with manic-depressive insanity, while the salient features of the chronic cases are distinctly of the type we associate with dementia praecox, viz., auto-erotism, negativism, ridiculous hypochondriacal delusions, and perverse sexuality. The term involution melancholia would therefore appear to be applied to two markedly opposed psychiatric divisions. MacCurdy considers it probable that individual taste is likely to determine the classification adopted by psychiatrists; but in any case the recognition of the facts is very important from the point of view of prognosis.

To summarize: (1) Patients with involution melancholia recover unless they show as dominants: (a) Marked insufficiency of affect; (b) Peevishness (auto-erotic behaviour); (c) Ridiculous hypochondriacal delusions, usually concerning the alimentary tract: these latter, however, may be present in women at the menopause without prejudicing the outlook for recovery. (2) All who eventually recover show improvement within four years of onset. The others run a chronic course or die unimproved.

JAMES YOUNG.

- [65] **The problem of the feeble-minded in South Africa.**—J. T. DUNSTON. *Jour. of Ment. Sci.*, 1921, lxxvii, 449.

THIS is a somewhat brief article concerning the administrative measures

taken to deal with the question of mental deficiency in the South African Union, the necessity for such action having arisen out of the fact that the work of the institutions under the departments of Education, Prisons, etc., was found to be much hampered by the numbers of the mental defectives who were accumulating in them. Thus in one industrial school 12 per cent of the girls were feeble-minded and 17 per cent were on the border line, in one reformatory 25 per cent of the boys were defective, while in a prison for older habitual offenders more than 10 per cent of the inmates were found to be seriously defective.

The author emphasizes the importance of recognizing the fact that the problem could only be solved by identifying the defective at the earliest possible school age, and indicates how the difficulty is being surmounted, the onus being thrown upon the principal of the school for calling the attention of the school medical officer to the child who is backward for longer than a certain period without a reasonable cause, while the Director of Education is made responsible for notifying the Commissioner in Mental Disorder of all defective children whether attending school or not.

The Commissioner is then required to keep a register of all mentally disordered and defective individuals, and to see that they are under proper guardianship and care, this latter duty being carried out by the medical superintendents and officers of the various mental hospitals, whose sphere of activity is not confined to the attending on the inmates of the hospitals to which they are attached, but is extended to include the area in which the hospital is situated.

These measures, apparently, do not affect the native population. The author mentions the difficulty of applying any definite standard to the intelligence of the native. He points out that, though the native has been living in close association with the European for some years, he has made little or no change in the extreme simplicity of his life. Such a persistence of custom would indicate a lack of intelligence, and the author adduces various arguments to support his view that the native is of a markedly low grade of intelligence, and that no amount of education would effect any improvement in his mental state.

Apart from the deficiency problem, reference is made to the very broad-minded and modern legislation in the matter of mental disorder. Any term, such as the word 'lunacy' or 'lunatic', which might offend susceptibilities, has been omitted, central reception houses have been established, while one section of the special Act provides for the treatment of suitable cases in the wards of the general hospitals.

T. R.

PSYCHOPATHOLOGY.

[66] Alcoholism in relation to mental depression.—P. JANET. *Jour. Amer. Med. Assoc.*, 1921, lxxvii, 1462.

THE author points out that a drunkard is not the same as an alcoholic. When he is not drunk a drunkard is normal; an alcoholic is never normal and seldom if ever is drunk. Indeed, under the influence of alcohol his

mental abnormalities are obscured, and it may be said that he is only well when he has taken his poison. Hence the craving of the alcoholic for his drink. The alcoholic practically always shows a bad family history and exhibits other nervous and mental symptoms such as obsessions, phobias, etc. There is generally aboulia, with other signs of poor powers of will and attention. A definite incident can usually be found to have determined the origin of taking alcohol. This may be a fever or other illness, a period of overwork, or a psychic shock. Such events produce the characteristic 'angoisse' and 'sentiment d'incomplétude'. Alcohol is only one method of combating this. It acts in the same way as a grave danger of any sort and 'mobilizes the forces' of the individual; but if the danger goes on too long, or too much drink is taken, then the reserves are used up and the depression gets worse than ever: then more alcohol is taken to cure this, and so the process goes on. The more difficult life is for an alcoholic the more will he take to drink, while if life is quite simple he may do with very little; but gradually the crave for drink becomes a definite impulsive action which becomes more and more fixed, so that everything is sacrificed to appease the craving. So far as treatment is concerned, the essential is to prevent, if possible, the development of mental depressions and to find stimuli other than alcohol to relieve them. As to the mental depressions, Professor Janet believes that they are often due to the over-education of minds not capable of undertaking the work expected of them.

R. G. GORDON.

[67] **Factors in suicide.**—ARTHUR H. RING. *Boston Med. and Surg. Jour.*, 1921, 185, 650.

REASONS given for suicide are either subjective—physical or emotional; or are objective, such as domestic, financial, etc. Can a death desire occur in a so-called normal person? How can we predict that such constitutes a danger in any particular individual? This latter problem is not of easy solution. Ring thinks that there are many persons who are born with a sense of inadequacy, to whom life easily becomes a burden, who are peculiarly sensitive and crave for love and sympathy. In the face of friction, such a type, with the instinctive feeling-tone of self-depreciation and abasement, is often potentially suicidal. Suggestion by example is not infrequently brought into play. It is thought that a definite suicide obsession may thus be often present in the mind, though only in the fringe of consciousness when stress is absent. The philosophy adopted towards life and future life, and McDougall's negative self-feeling instinct, play an important part. In depressed states, however, physical factors, such as faulty action of the sympathetic and autonomic systems, may be primary. Those who have repressed excessive sexual desire are frequently candidates for suicide. The antithesis of the wish to beget life is to destroy it. According to Swan, of Cambridge, an atrophied testicle is frequently found in those who commit suicide. Sexual perversions, especially homosexuality, are predisposing in sensitive natures. Both sadism and masochism may lead to suicide. Manic-depressive cases we know are always potentially

suicidal, and the author regards acute hallucinosis as also dangerous in this respect. Syphilis of the cerebrospinal type is thought to lead to self-destruction, and arteriosclerotic men occasionally kill themselves. That hysterics sometimes are suicidal is shown by an illustrative case. Psychasthenics rarely carry out a suicidal act, because of their indecision, but they occasionally make attempts.

C. STANFORD READ.

[68] **The causes and treatment of juvenile delinquency** (*continued—see May No.*).—CYRIL BURT. *Psyche*, 1922, ii, 339.

IN continuing his discussion of intellectual conditions, the author finds that 4 per cent of his cases are distinctly above the average in general intelligence. The intellectual delinquent is a serious menace to society if his tendencies are not checked in youth. The writer considers that the emotional factors are far more important than the intellectual, more than half of his cases being congenitally unstable in temperament.

He classifies the commoner forms of juvenile offence, and finds that they correspond to the current psychological classification of the primitive instincts. He suggests that, at any rate with juvenile criminals, the actual offence is, in its immediate result, the natural manifestation of some primitive instinct (such as sex, anger, acquisitiveness, wandering, and so forth), with but slight modification. He considers, however, that this simple explanation is by itself adequate only for the rarer instances of delinquency in either very young or very dull and defective offenders. As a rule, in the older cases, whose intelligence is normal or nearly normal, there is in the background a highly complicated psychological mechanism.

There can be no such thing as a special and distinct condition to be named inborn criminality; almost every native impulse may, in a civilized community, become criminal. Sexual vice and crime are the clearest illustration of the author's view, and he thinks that Freud underestimates the importance of the sex instinct during the period of latency corresponding with the elementary school career. Any of the partial and subordinate sexual tendencies may lead to a direct misdemeanour.

The writer cannot quite agree with McDougall that anger is wholly a secondary instinct, although he thinks it is advisable to explore for a primary obstructed desire as a cause of the outburst. The instinctive angry displays of the infant may take a criminal turn at an early age.

In dealing with acquisitiveness, the author believes that many young defectives show an almost reflex tendency in their petty thefts, and steal for the sake of the pretty, glittering, pocketable coins rather than for their actual value. It is commoner, however, for the child to have a desire for the object to be purchased with the stolen cash. The stolen article may be symbolic of something else which is desired. Stealing may commence as a substitutional reaction for a balked impulse. As an explanation for the prevalence of theft appearing as a substituted safety-valve for the balked outlet, it is suggested that acquisition, like anger, is essentially an instinct for coping with an obstacle. Acquisition differs from the

other instincts in being a cumulative process, and touches no limit. This conspires to make it responsible for 90 per cent of crime. Diagnostic importance is attached to the type of theft as indicating the progression of the criminal propensities.

ROBERT M. RIGGALL.

TREATMENT.

[69] **Methods of dream analysis.**—W. H. R. RIVERS. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii, 101.

RIVERS, considering that the conditions under which dreams are recorded and analyzed have a great influence upon the results obtained in the analysis, seeks a procedure whereby these factors shall be reduced to as small proportions as possible. He explains the procedure which he himself has adopted to this end, and invites criticism with a view to improving it. Rivers holds that the thoughts associated with a dream are the more likely to lead back to those by which the dream was determined, the more influences of other kinds can be excluded and the less the degree in which witting processes are allowed to intervene. On the assumption that the latent thoughts which have determined the dream during sleep continue to be active in the half-waking period which follows it, this time and state are ideal for its analysis. Rivers has subjected his own dreams to self-analysis in this way, and has thus also eliminated any error which might be introduced by a foreign analyst. In spite of all his precautions, Rivers admits that his method is not of universal application or infallible, but claims that it is free from certain sources of error which must accompany the usual procedure. The matter is one of scientific rather than practical interest.

ALFRED CARVER.

Reviews.

Psycho-analysis in the Service of Education: being an Introduction to Psycho-analysis. By Dr. OSKAR PFISTER, Pastor and Seminary Teacher at Zurich. Pp. xii + 176. 1922. London: Henry Kimpton. 6s.

THIS book is of interest as being the latest expression of opinion on the part of an author who may be justifiably regarded as the foremost authority on the application of psycho-analysis to education. It represents the material contained in a series of lectures delivered before a convention of teachers of whom the majority were already familiar with psycho-analysis, at least in its fundamental principles. In view of the fact, however, that some among his audience were entirely ignorant of the subject, Dr. Pfister was compelled to attempt the double task of "providing for beginners, on one hand, an easily comprehensible introduction, and for advanced students, on the other hand, an explanation of his position towards the most important and debatable points of psycho-analytical investigation". The co-existence of these two aims makes the book slightly more difficult to the beginner than it would otherwise be, though on the whole the two points of view are so skilfully blended as to make the volume interesting to the advanced worker without being confusing or unintelligible to those who are approaching the subject for the first time.

The book is divided into three parts. The first (which is entitled "The Study of Psycho-analysis a Duty of Every Teacher") indicates briefly the nature and aims of psycho-analysis itself, the nature of the pedagogical problems to which psycho-analysis may be applied (a most interesting and suggestive review), and the comparative helplessness of other methods in the face of these problems. The second part (entitled "The Scientific Justification and Demand for Analytic Education") gives a fuller presentation of the theory, methods, and results of psycho-analytic therapeutics, and has subsections dealing with the theory of repression, subconscious repression activities, the reaction of the repressed on the conscious manifestations, corporal manifestations of the repressed impulses, and psychopathological manifestations of the repressed. This part constitutes on the whole a lucid and useful review of the subject, with the interests and requirements of the teacher kept more prominently and constantly in mind than in the writings of any other psycho-analyst.

The third part, "The Practice of Pedanalysis", is perhaps a little disappointing as it stands, and could very well have been expanded. Although the information it contains is useful and trustworthy so far as it goes, there

is a certain lack of concreteness and definiteness that will be a source of regret to those who are interested in the question as to the possibility and desirability of applying psycho-analysis to the actual cases that present themselves in the course of their educational work. It is true that Dr. Pfister deals fairly fully with the important problem as to what kind of cases should be analyzed by the educator and what should be referred to the physician. But beyond this there lie a number of further difficult questions that face the would-be educational analyst. For example: Is the child requiring analysis to be treated by his own teacher? If so, is the dual relationship that would be required in such a case one that is practically workable (its difficulties are obvious)? If workable, what are the advantages and disadvantages of this procedure? If unworkable, what alternatives present themselves (analysis by another teacher or by an outside [lay?] expert)? How is the teacher to find time for psycho-analysis in the midst of his other duties? How may he best qualify himself for his new task? Where should the analysis be carried out (in the school, the child's home, the teacher's home)? What modifications, if any, in the technique of psycho-analysis are desirable for work with children of school age? On these and on certain other equally difficult and urgent questions, suggestion and advice from Dr. Pfister would have been most valuable, and we can only hope that in a future volume he will communicate some of the results of his mature experience in so far as they bear upon these points, which are of the greatest practical importance for the teacher who is desirous of actually applying the psycho-analytic method to the solution of pedagogical problems.

Furthermore it seems, to the present reviewer at least, that Dr. Pfister has failed to draw adequate attention to what may well prove to be two of the most important applications of psycho-analysis to education—applications that are independent of the actual practice by the teacher of psycho-analysis as a technical therapeutic method. These are: (1) The increased understanding of (childish) human nature that should result from a proper assimilation of the principles and results of psycho-analysis—an understanding that should make it easier for the teacher to avoid a good many of the pitfalls into which he might otherwise stray in dealing with difficult situations or with difficult or unusual types of character; (2) The increased understanding of his own psychology and of the nature of the psychological relations between himself and his pupils—these being also matters which should materially assist him in the delicate problems which he necessarily encounters in the course of his work.

As is perhaps to be expected from the nature of his outlook, Dr. Pfister lays greater stress upon moral aspects than do most other psycho-analysts, who are concerned only with scientific or therapeutic problems. As regards other individual points of view, the advanced student will be interested to note Dr. Pfister's advocacy (p. 47) of what he calls the 'organic method' in psycho-analysis (the nature of which, however, he fails to make sufficiently clear), his treatment of the subject of regression (pp. 68 ff.), and his somewhat unusually pessimistic outlook with regard to the more serious cases of obsession. It is also interesting to observe that Dr. Pfister takes

a much more definitely unfavourable view towards the opinions of Jung and Adler than in his earlier work on *The Psycho-analytic Method*.

The translation (which, we are told in the Preface, represents the joint work of Dr. C. R. Payne, Dr. F. Gschwind, and Miss B. Low), though for the most part accurate and readable, does not always succeed in concealing the fact that the book was not originally written in English: as when we read of the philosophy of "*a musician like Gounod*", of the support given to psycho-analysis by Stanley Hall, "*the celebrated psychologist of youth and religion*", or of the teacher upbraiding a pupil "*psychologically-phenomenologically rightly*" for his inattention.

J. C. FLUGEL.

Delusion and Dream: an Interpretation in the Light of Psycho-analysis of 'Gradiva', a Novel, by Wilhelm Jensen. By Dr. SIGMUND FREUD. Translated by HELEN M. DOWNEY, M.A. Introduction by Dr. C. STANLEY HALL, President of Clark University. Demy 8vo. Pp. 213. 1921. London: George Allen and Unwin Ltd.

THIS book consists of two parts. The first is a translation of *Gradiva*, a brilliant and unique story as Professor Stanley Hall describes it, by Wilhelm Jensen. The novel is one of artistic merit and considerable charm, and concerns the adventures of a young archæologist who passed through a psychosis from which he gradually emerged, the cure being effected through the agency of the clever heroine when he had formerly loved and then forgotten. The story ends with the reawakening of the confused young man's love, and everything turns out very happily.

The second part consists of a translation of Freud's work, *Der Wahn und die Traume in W. Jensen's 'Gradiva'*, published in 1907 as the first number of the *Schriften zur Angewandten Seelenkunde* series. Freud here investigates by the psycho-analytic method the behaviour, character, history, dreams, and delusions of the fictitious young archæologist created by the art of Jensen as if he had been dealing with an actual case. As a result of his investigation, Freud is able to show that the story of mental illness and its treatment is an absolutely correct study in psychiatry, and that the phantasy of the novelist, expressed in the characters he has created, is subject to the same laws of psychic life as dreams have been shown to be, and that it is susceptible to the same methods of interpretation. The question naturally arises, and is here considered, as to how the author could have gained his knowledge of the laws of mental life so that he was able to write a story which served to illustrate them with such accuracy. The question is one of definite interest, because its solution may, as Freud points out, afford us a little insight into the nature of creative literary production. It is suggested that the psychologist who has formulated the laws of mental life, and the artist who has expressed them in the creatures of his imagination, have each, though with a different method, gained their knowledge from the same source. The psychologist has consciously observed the abnormal psychic processes of others, and the artist has directed his attention to the unconscious of his own psyche, listened to its

possibilities of development, and granted them artistic expression, instead of suppressing them with conscious critique. No doubt this explanation is applicable to all productions having not merely technical but artistic merit. Perhaps this is why *Gradiva* differs from a number of modern novels which give the impression that their authors have learnt the rules of the New Psychology and then made characters to fit them.

Freud's analysis is attractively written in an almost conversational style, and the whole book makes pleasant reading. It would serve as an introduction to psycho-analysis, as it describes very clearly, and on the whole convincingly, the influence of repressed erotic trends in the production of dreams, delusions, and oddities of conduct.

H. DEVINE.

Treatment by Hypnotism and Suggestion or Psychotherapeutics.

By C. LLOYD TUCKEY, M.D. Seventh edition. Demy 8vo. Pp. 406. 1921. London: Baillière, Tindall & Cox. 21s.

It may be thought at first sight that a book of this nature is no longer necessary. It is not a compliment to the medical profession that it should be so; but a little thought calls to mind the large amount of prejudice that must still be admitted in the medical profession against psychotherapy in general. This book should therefore still serve a useful purpose in putting clearly before the sceptic the actual results achieved through hypnotism in particular; for he must be the most rigid of sceptics who fails to be convinced by the long list of cures set forth: so long, indeed, is this list that it becomes somewhat tedious, and it seems likely that in spite of the author's warning the impression may be given that hypnotism is a panacea for all ills.

Arguing from Herbert Spencer's theory quoted by the author in Chapter IV, critics might attack the claims made, on the grounds that as a general rule it is the weaker personalities that can be hypnotized; but Dr. Tuckey shows conclusively to what an extent hypnotism can be used in the relief of suffering, and more than justifies its claim to a position in the front rank of those instruments available to the physician for his work of healing.

D. L. TUCKER.

Psycho-analysis and the War Neuroses. By Drs. S. FERENCZI, KARL ABRAHAM, ERNST SIMMEL, and ERNEST JONES. Introduction by Professor FREUD. Royal 8vo. Pp. 59. 1921. London: International Psycho-analytical Press, and George Allen and Unwin, Ltd., 7s. 6d. net.

EXCEPT for an introduction by Freud, dated 1919, these essays present the views of representative psycho-analysts in 1918, and take as their general theme the exposition and defence of psycho-analytical theory as applied to the war neuroses.

Dr. Ferenczi describes the supersession of the organic-mechanistic theory by the psychogenetic conception, but complains that neurologists have made familiar the ideas of psycho-analysis—abreaction, the unconscious, etc.—without using them in the neuroses of peace time.

Dr. Abraham finds a connection between a labile sexuality and the disposition to breakdown: his explanation of the importance of narcissistic fixation, though acceptable to psycho-analytical orthodoxy, is not presented in such a way as to appeal to the sceptic.

Dr. Simmel describes methods of revival of recent memories such as were commonly used in this country, and shows convincingly that the symptomatology is determined by unconscious war affects. He introduces the hypothesis of 'auto-suggestion', which is surely unnecessary if he accepts the Freudian view. Experience of our own pensioners confirms his view that the 'seeking for a pension' (*die Rentengier*) is often a pathological manifestation, and not to be superficially explained by the desire for gain.

One is already familiar with the paper by Dr. Ernest Jones, which was read before the Royal Society of Medicine. He gives a brief but closely reasoned account of psycho-analytical theory as applied to the war cases, though, like his continental co-workers, he admits no fundamental difference between these and the neuroses of peace time. He concludes that psycho-analysis need not be undertaken in the majority of cases, but that a training in it is of the utmost value in treatment.

In the light of later experience one might go farther than these writers, and question their free use of the term 'traumatic neurosis'. The war patients, even those described as suffering from 'shell-shock', are gradually drifting into other categories: we see them taking on, for example, the symptoms of definite obsessional neuroses. Freud's observation that the war neuroses disappeared on the cessation of war conditions is not confirmed over here: discussion of the reason for the discrepancy might prove interesting.

This little collection of essays should interest anyone who has come into touch with the subject: it is important because, although many workers made use of psycho-analytical methods and conceptions in varying degrees, yet the strictly Freudian school had added very little to the discussion of the war material: probably because the psycho-analyst found little novel in what seemed strange and new to other observers.

MILLAIS CULFIN.

Psychologische Analysen hirnpathologischer Fälle (Psychological Analysis of Cases of Brain Disease). By ADHEMAR GELB and KURT GOLDSTEIN. Vol. I. Pp. 561. 1921. Leipzig: J. A. Barth. M. 60.

THIS volume consists of a number of papers which have been published already in certain of the German neurological and psychological journals, and are part of the output of the "Institute for the Investigation of the Sequelæ of Cerebral Injuries" in Frankfurt. They form a notable contribution to the study of the difficult borderland between neurology and psychology, and as such merit attentive consideration. A series of cases of head injury in warfare is here presented, and with a minimum of theorizing and speculation there is combined a wealth of clinical, objective description of symptoms, such as is far too rare in these days of easy familiarity with psychological mechanisms and of over-accentuation of unconscious.

subjective processes. The first paper, on the psychology of visual perception and recognition, is concerned with the case of a man of 24, wounded in 1915 over the left occipital region by a fragment of shell. The area corresponded to the lateral posterior aspect of the occipital lobe and the left side of the cerebellum. With the visual symptomatology the writers of the paper are mainly occupied. In addition to a concentric diminution of both visual fields (a point itself of much neurological interest), and a micropsia confined to the horizontal dimensions of objects, the patient exhibited in an almost pure form the apperceptive variety of 'mind-blindness' (better, of visual agnosia): that is, in spite of good vision, colour sense, and appreciation of distance, he was absolutely incapable, as the authors convincingly prove, of combining into a visual whole the individual optical elements of anything he looked at. He could tell whether a given 'something' was higher or lower, more to right or left, than another; he could say whether it was large or small, thin or thick, short or long, near or distant, coloured or not; but beyond this he was unable to awaken thereby in his mind any idea of the form of the object. With this defect, naturally, went the alexia which he also showed. Because of this impairment in the synthetic 'structuralization' of his visual impressions, he could not draw or paint objects he looked at, though he drew well enough 'out of his head'. It is made clear that the defect was not one of associative mind-blindness, i.e., where the patient sees an object and forms a normal visual idea of it, though he fails to *recognize* it by sight; in the present case the subject sometimes obtained a very fair idea of the nature and significance of an object, although it was for him, visually, a mere 'spot'. For a period of not less than four years this main visual symptom has remained unchanged. The absence of any hemianopia or achromatopsia shows that the calcarine area is intact, and the authors appear justified in their conclusion that there is in their case a limited lesion of a specific optic mechanism, viz., that concerned with the appreciation of the forms of seen objects, and this they localize somewhere in the outer posterior part of the occipital cortex. Of particular interest is the fact that a left-sided lesion gave rise to one of the varieties of 'mind-blindness'.

Other papers must be more briefly alluded to. One is devoted to the question of spiral fields of vision, so called, which are attributed entirely to perimetric examination; another embodies the results of a minute investigation into the question of localization of seen objects in recovering hemianopic fields; errors of localization as revealed by the tachistoscope are fully analyzed and their significance discussed. Another deals with the defective localization and apparent displacement of objects placed partly in the normal and partly in the affected fields, in cases of hemianopia.

Reference, however, must be made to a communication which bears on the possibility of transcortical forms of sensory disturbance, and will repay careful study. The patient (the same case as that of the first paper) was unable to form any visual idea in the mind of the movements of his limbs, and though sensibility in the ordinary sense was intact he could not recognize any passive movement impressed on a limb or segment of a limb unless he made certain movements of his own at the same time. To

localize the movement this was essential, that he should awaken kinaesthetic impressions of his own, as it were, experimentally, and then ascertain which coincided, more or less, with that which had been passively aroused. There was also present a degree of tactile agnosia, as distinct from astereognosis—a transcortical disorder of sensory function.

Functional Nervous Disorders: their Classification and Treatment.

By DONALD E. CORE, M.D., M.R.C.P., Honorary Assistant Physician, Manchester Royal Infirmary; Lecturer in Neurology, the Victoria University of Manchester. Large 8vo. Pp. xvii + 371. 1922. Bristol: John Wright & Sons Ltd. 25s. net.

THE time has come when we should either discard the term 'functional' in relation to nervous disorders, or should come to a clearer understanding of what we mean by it. In the broadest sense of the term, all symptoms of disease imply a disorder of function; but in its most usual sense the word 'functional' is taken to denote those disorders in which we have *at present* been unable to discover any structural basis for the trouble. It is clear that with the progress of knowledge we may expect gradually to diminish the number of the diseases which are, according to this classification, lumped together under the temporary heading of 'functional'. In the last edition of a well-known text-book of medicine, published in 1915, paralysis agitans is included under functional disorders of the nervous system; but in the light of modern researches we can have little doubt of its basis in structural disease.

We have therefore been using functional in this way as equivalent to "not (so far) proved to be structural"—a positive word in a negative sense. There is no justification for such a euphemism to cloak our ignorance, and we should do better to accept the title "Nervous Disorders of Uncertain Origin". In the other sense in which it is commonly employed, 'functional' is taken to include such disorders as, not coming within the pale of insanity, are yet recognized as being due to disturbances of mind rather than body. It is in this latter sense that Dr. Core employs the term. The reviewer must in fairness to the author admit that he came to his task with a prejudice against this book. On more than one previous occasion has he waded heavily through volumes dealing with the same subject, feeling as one clogged to the knees in Flanders mud. Nor at the end has he ever discovered himself nearer to the objective truth. There is no subject in medicine which suffers so much from the inherent difficulties of written speech as that of psychology. In other branches we can, when words become incomprehensible, find comfort in the mathematical formula, the diagram, or the photograph, but in the perusal of the psychological monograph we are at the author's mercy. Dr. Core has not spared us.

In his preface he deprecates "the current vagueness in the definition and classification" of the conditions of which he writes. He proceeds in a few pages to his own classification into a regressive and a progressive group. Under the former he includes only hysteria, but distinguishes three types—primary, secondary, and tertiary—which differ apparently according to the 'atmosphere' in which the symptoms arise. Thus,

"symptoms arising in an atmosphere associated with discomfort in the broadest sense in any part of the body" are defined as characterizing secondary hysteria. So also the sub-groups under the progressive heading are classified according to the 'atmosphere' in which the symptoms develop.

We have no very clear idea of what Dr. Core means by the word 'atmosphere' in this sense, nor does he subsequently succeed in elucidating the point for us. It becomes obvious that in order to understand his book we must first set ourselves to learn the language in which he writes, and this in itself is a formidable task. When we have at times penetrated his meaning we have found that his views upon psychological problems are in many ways original and interesting; he has made an earnest attempt to contribute from his own store of knowledge to the advancement of psychological science. We may, however, ask ourselves whether at this stage of our experience there is room for so much theory. Have we not rather need for much patient recording, analysis, and correlation of facts, in the form of careful life-histories of individual patients, before we can be in a position to enunciate general rules?

In the opinion of the author the disorders of his progressive group lead to involuntional changes in the heart, brain, and kidneys, and thus form the starting-points for organic disease. In this connection it is of interest to note that, in the chapter on diagnosis, disseminated sclerosis is mentioned as a possible complication of hysteria, where the statement is made: "This is, I think, recognized by modern clinicians, who are accustomed to bear the idea of disseminated sclerosis in mind as a possible, if relatively rare, development in any case diagnosed as hysterical". Such a view is, of course, entirely opposed to the growing body of evidence which suggests that disseminated sclerosis is a specific infection of the central nervous system. Nor can we accept the simple explanation of the pain occasionally experienced in a phantom limb, that this occurs only in men whose "egos are peripherally determined".

On the whole the chapter dealing with methods of treatment is of greatest interest, and is certainly of most practical value. It is clearly written from the author's own experience, and is free from the bias of any particular cult of psychotherapy.

C. P. S.

The Psycho-analytic Study of the Family. By J. C. FLÜGEL, B.A.,
Senior Lecturer in the Department of Philosophy and Psychology,
University College, London. Large 8vo. Pp. x + 29. 1921.
London: The International Psycho-analytical Press. 10s. 6d. net.

ONE of the most important and interesting of the many problems presented to us by psycho-analysis is the influence of early family life in shaping character. Though this question must in the nature of things rank second to that of the still earlier influences which determine character itself, a psycho-analytic study of the family necessarily deals with matters which go deep in explaining and accounting for temperament and behaviour in adults. The subject has received much attention since Freud first discovered and described the main facts, and a fairly complete under-

standing of the problems involved has now been reached. Unfortunately the facts have never before been brought together, and much of the material is still inaccessible to the English-speaking public. It is therefore a great satisfaction to find that both these disadvantages have now been removed, thanks to the labours of Mr. Flügel.

The preparation of a book of this kind entails a vast amount of work—collecting the material, sorting it, criticizing and explaining it, and adding original applications to complete the whole. Mr. Flügel has done all this thoroughly and well. His nineteen chapters comprise roughly three main divisions: first, the influence of the family on the child personality; next, the consequences of this in adult love-life; and lastly, the ethical and practical applications of the foregoing. Throughout, the various topics are discussed fully, concisely, and clearly, with ample references to original sources of information.

It will be seen that the author set himself a task of considerable magnitude and of a particular kind in which he had no example to follow in any language. It must be said that he has carried it through in a manner which commands nothing but praise. *The Psycho-analytic Study of the Family* is a complete and authoritative exposition of the subject, and is likely to hold the field against all comers for many years. D. F.

Disguises of Love (Psycho-analytical Sketches). By DR. WILHELM STEKEL, Vienna. Translated by ROSALIE GABLER. Crown 8vo. Pp. 171. 1921. London: Kegan Paul, Trench, Trübner & Co. Ltd. 6s. 6d. net.

THIS volume is the third of a series by the same author; the other two, *The Beloved Ego* and *The Depths of the Soul*, were reviewed in a former number of this Journal. In the nineteen chapters comprising the book, we have everyday psychopathological material dealt with in the same attractive style. The themes discoursed upon are as varied as ever, and in them all Dr. Stekel is happy, instructive, and entertaining. If we wished to be very critical, some of the author's statements might be doubted; but it would seem out of place for us to say anything which would in any way needlessly belittle a book which is so artistic and engaging. As an aid to self-knowledge it can be warmly advocated, and it is just the form of literature which could be safely placed in the hands of intelligent neurotic individuals and only benefit would accrue. The field of circulation should be very wide, for it should appeal to both lay and medical readers alike, and can only tend to render psycho-analytical principles more popular.

C. STANFORD READ.

The Technique of Psycho-analysis. By DAVID FORSYTH, M.D., D.Sc. (Lond.), F.R.C.P. (Lond.). Crown 8vo. Pp. 133. 1922. London: Kegan Paul, Trench, Trübner & Co. Ltd. 5s. net.

NOTWITHSTANDING the profuse literature dealing with psycho-analysis which has been in evidence of late years, with the exception of a monograph

on technique by the American neuropsychiatrist, Smith Ely Jelliffe, this is the sole work in English to deal with such an important branch of the subject. Though it may truthfully be said that practical experience will finally be the safe guide, it is essential that at the outset some authoritative pronouncement of the principles involved should be available in order to avoid as far as possible the many pitfalls which must beset the path of the unexperienced analyst. As we find in all realms of medicine, at the start of applying our theoretical knowledge and dealing with human values, difficulties arise which were undreamt of. When the human mind is being investigated, and the special factors in the relationship between physician and neurotic patient are encountered, the need for practical advice becomes all the more indispensable. Since there is reason for believing that the ranks of analysts are swelling in numbers, this handy volume is exceedingly welcome. It comprises three topics: (1) The analyst; (2) The prerequisites of the treatment; (3) The analysis proper. In the first chapter it is well pointed out how different the mental attitude of the physician must be from that adopted in general practice, how essential it is that he should always remain passive and exercise an emotional detachment which is a well-nigh impossible task unless he is freed from his own complexes, preferably by a course of psycho-analysis. How narcissism and other factors on the analyst's part may interfere with the course of progress is adequately dealt with. In the prerequisites of treatment such points as length of time taken, prospect of cure, cost, hours of attendance, punctuality, position of patient, direct analysis of symptoms, note-taking, etc., are discussed *seriatim*. In the later pages the analysis proper is considered, and the technique involved in the problems of transference and resistance is presented lucidly. The final chapter is concerned with termination of the analysis, a subject which not infrequently affords much difficulty to the tyro. Though, when circumstances render a restricted analysis necessary, much benefit may be gained, in other cases the criterion to be adopted is the fitness of the patient to meet the demands of everyday life, and it should not be hard to form such a judgement. Care must be taken how sublimation is guided, and warning and advice are given concerning those exceptional cases where either positive or negative transference requires special handling at the termination.

Within so small a scope it is by no means easy to deal with such a subject as the technique of psycho-analysis, but Dr. Forsyth has succeeded admirably in giving us all the essentials without any irrelevant material. Only those theoretical points needed for an adequate grasp of the rationale of practice are introduced, while clarity of exposition is marked. The book fulfils a distinct want and can be cordially recommended to all psycho-analysts in need of help in this direction.

C. STANFORD READ.

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Original Papers.

ON THE PRODUCTION OF NEUROMUSCULAR PATTERNS BY RELEASE OF SPINAL INTEGRATIONS AFTER DECEREBRATION.*

By WALTER M. KRAUS AND
ABRAHAM M. RABINER, NEW YORK.

- I.—INTRODUCTION.
- II.—THE NEUROMUSCULAR MECHANISM.
- III.—A NEUROMUSCULAR ANALYSIS OF THE EXPERIMENTAL AND CLINICAL
EVIDENCE FOR DECEREBRATE RIGIDITY AND THE FLEXION REFLEX.
 - A. The Experimental Evidence.
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- VI.—THE RELATION OF POSTURE PATTERNS TO TONE.
- VII.—THE KINETIC AND STATIC TYPES.
- VIII.—SUMMARY AND CONCLUSIONS.

I.—INTRODUCTION.

THANKS to the efforts of S. A. K. Wilson, we now have a clinical application of that part of the experimental work of Sherrington which demonstrated the existence, after removal of the more anterior parts of the central nervous system, of the condition known as decerebrate rigidity. This clinical and pathological study promises to clear up many of the obscure problems, not only of defects of posture, but of the physiology of the nervous system in general. It

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is our desire to assist in this by analyzing, from a new angle, a series of cases showing decerebrate posture.

One of us¹ in November, 1921, presented a preliminary general outline of this new approach to the subject of motility and posture. In this paper decerebrate postures will be considered from that point of view.

II.—THE NEUROMUSCULAR MECHANISM.

The essential point of the neuromuscular approach to the subject of motility and posture lies in two assumptions. One is that a description of groups of movements in terms indicating merely the activity of muscles in changing the position of various parts of the body in a geometrical sense has, on careful analysis, no definite relationship to any integration of movements by the spinal cord or higher centres of the nervous system. The other assumption is that movements, grouped or isolated, must be considered as activated by the nervous system in patterns primarily dependent upon the primitive and anatomical grouping of muscles, and not upon their function only. The peripheral motor neurones and their end-organs, the muscles, have group relations indicating integration by the spinal cord. This implies that the anatomical grouping of muscles, the common nerve-supply of certain groups of them, their common origin on certain aspects of the body, must form bases for the interpretation of group movements. The simplest example of this is the division of the musculature of the back, neck, and abdominal wall into dorsal and ventrolateral groups. The application of this information to physiology reveals immediately that the dorsal group causes extension while the ventrolateral group causes flexion. The lateral and rotatory movements produced by these groups of muscles are due to over-activity of the right or left halves of either the dorsal or ventral groups or both.

In the more distant portions of the extremities the muscles also develop in large 'premuscle masses' from the ventral and dorsal aspects.² These masses give rise to groups of muscles whose nerve-supply are respectively dorsal and ventral. For example, of the branches of the brachial plexus going to the arm, forearm, and hand, the circumflex and musculospiral are dorsal, and innervate muscles derived from the dorsal premuscle mass, while the musculocutaneous, median, and ulnar are ventral, and supply muscles derived from the ventral premuscle mass. However, an examination of the functions of muscles does not always reveal a correspondence between actual function and that expected. In other words, muscles developing on the dorsal aspect of the limb have not always dorsal functions, such as extension, and vice versa. The best examples of this are as

follows: The muscles ilio-psoas, pectineus, sartorius, on the anterior aspect of the thigh, since they are dorsal in origin (part of the so-called femoral group), would, by analogy with the axial muscles, be expected to have an extensor function, whereas, in reality, their function is flexor. In the hand the interossei extend the terminal phalanges, though, with the exception of the abductor digiti quinti, all the other muscles supplied by the ulnar nerve and of the same group have a flexor function. Since the actual anatomical facts form the basis of the entire matter, these must be presented at once. In *Tables I, II, and III* the muscles of the body, except those supplied by cranial nerves, will be found arranged in dorsal and ventral groups. In *Table IV* the spinal motor nerves will be found so arranged. This last tabulation has been taken from Patterson's article in Cunningham's *Text-book of Anatomy*.³

Table I.—DIVISION OF THE MUSCLES OF THE UPPER EXTREMITY INTO VENTRAL AND DORSAL GROUPS.

MUSCLE	VENTRAL	DORSAL
1.—Levator scapulae	-	-
2.—Serratus anterior	-	-
3.—Rhomboides major	-	-
4.—Rhomboides minor	-	-
5.—Supraspinatus	-	-
6.—Infraspinatus	-	-
7.—Teres minor	-	-
8.—Deltoid	-	-
9.—Subscapularis	-	-
10.—Teres major	-	-
11.—Latissimus dorsi	-	-
12.—Subclavius	-	-
13.—Pectoralis major	-	-
14.—Pectoralis minor	-	-
15.—Biceps brachii	-	-
16.—Brachialis*	-	-
17.—Coracobrachialis	-	-
18.—Brachioradialis	-	×
19.—Extensor carpi radialis longus	-	×
20.—Extensor carpi radialis brevis	-	×
21.—Supinator	-	-
22.—Extensor pollicis longus	-	×
23.—Extensor indicis proprius	-	×
24.—Abductor pollicis longus	-	-
25.—Extensor pollicis brevis	-	×
26.—Extensor communis digitorum	-	×
27.—Extensor carpi ulnaris	-	×
28.—Extensor minimi digiti quinti	-	-
29.—Anconeus	-	-
30.—Triceps	-	×

*Supplied by both dorsal and ventral nerves.

Table I.—DIVISION OF THE MUSCLES OF THE UPPER EXTREMITY INTO VENTRAL AND DORSAL GROUPS.—*continued.*

MUSCLE	VENTRAL	DORSAL
31.—Pronator teres	-	-
32.—Flexor carpi radialis	-	-
33.—Palmaris longus	-	-
34.—Flexor digitorum sublimis	-	-
35.—Flexor digitorum profundus	-	-
36.—Flexor pollicis longus	-	-
37.—Pronator quadratus	-	-
38.—Lumbricalis 1	-	-
39.—Lumbricalis 2	-	-
40.—Lumbricalis 3	-	-
41.—Lumbricalis 4	-	-
42.—Abductor pollicis brevis	-	-
43.—Opponens pollicis	-	-
44.—Flexor pollicis brevis (lateral head)	-	-
45.—Flexor pollicis brevis (medial head)	-	-
46.—Flexor carpi ulnaris	-	-
47.—Adductor pollicis obliquus	-	-
48.—Adductor pollicis transversus	-	-
49.—Interosseus volaris 1	-	-
50.—Interosseus volaris 2	-	-
51.—Interosseus volaris 3	-	-
52.—Interosseus dorsalis 1	-	-
53.—Interosseus dorsalis 2	-	-
54.—Interosseus dorsalis 3	-	-
55.—Interosseus dorsalis 4	-	-
56.—Opponens digiti quinti	-	-
57.—Flexor digiti quinti brevis	-	-
58.—Abductor digiti quinti	-	-

Table II.—DIVISION OF THE MUSCLES OF THE LOWER EXTREMITY INTO VENTRAL AND DORSAL GROUPS.

MUSCLE	VENTRAL	DORSAL
1.—Iliacus	-	-
2.—Psoas major	-	-
3.—Psoas minor	-	-
4.—Pectineus*	-	-
5.—Sartorius	-	-
6.—Rectus femoris	-	-
7.—Vastus lateralis	-	-
8.—Vastus medialis	-	-
9.—Vastus intermedius	-	-

*Supplied by both dorsal and ventral nerves.

Table II.—DIVISION OF THE MUSCLES OF THE LOWER EXTREMITY INTO VENTRAL AND DORSAL GROUPS—*continued.*

MUSCLE	VENTRAL	DORSAL
10.—Tensor fasciæ latæ - - - -		×
11.—Gluteus minimus - - - -		×
12.—Gluteus medius - - - -		×
13.—Piriformis - - - -		×
14.—Gluteus maximus - - - -		×
15.—Biceps femoris (short head) - - - -		×
16.—Biceps femoris (long head) - - - -		
17.—Semitendinosus - - - -		
18.—Seminembranosus - - - -		
19.—Adductor magnus - - - -	×	
20.—Obturator externus - - - -	×	
21.—Adductor longus - - - -	×	
22.—Adductor brevis - - - -	×	
23.—Gracilis - - - -	×	
24.—Obturator internus - - - -	×	
25.—Superior gemellus - - - -	×	
26.—Inferior gemellus - - - -	×	
27.—Quadratus femoris - - - -	×	
28.—Tibialis anterior - - - -		×
29.—Extensor hallucis longus - - - -		×
30.—Extensor digitorum longus - - - -		×
31.—Peroneus tertius - - - -		×
32.—Peroneus longus - - - -		×
33.—Peroneus brevis - - - -		×
34.—Extensor digitorum brevis - - - -		×
35.—Gastrocnemius - - - -		×
36.—Soleus - - - -		×
37.—Plantaris - - - -		×
38.—Popliteus - - - -		×
39.—Tibialis posterior - - - -		×
40.—Flexor digitorum longus - - - -		×
41.—Flexor hallucis longus - - - -		×
42.—Quadratus plantæ - - - -		×
43.—Abductor digiti quinti - - - -		×
44.—Flexor digiti quinti brevis - - - -		×
45.—Opponens digiti quinti - - - -		×
46.—Interosseus plantaris 1 - - - -		×
47.—Interosseus plantaris 2 - - - -		×
48.—Interosseus plantaris 3 - - - -		×
49.—Interosseus dorsalis 1 - - - -		×
50.—Interosseus dorsalis 2 - - - -		×
51.—Interosseus dorsalis 3 - - - -		×
52.—Interosseus dorsalis 4 - - - -		×
53.—Adductor hallucis - - - -		×
54.—Lumbricalis 1 - - - -		×
55.—Lumbricalis 2 - - - -		×
56.—Lumbricalis 3 - - - -		×
57.—Lumbricalis 4 - - - -		×
58.—Abductor hallucis - - - -		×
59.—Flexor digitorum brevis - - - -		×
60.—Flexor hallucis brevis - - - -		×

Table III. —DIVISION OF THE MUSCLES OF THE AXIS INTO VENTRAL AND DORSAL GROUPS.

MUSCLE.				VENTRAL	DORSAL
Muscles of the Back.					
Serratus posterior superior	-	-	-		×
Serratus posterior inferior	-	-	-		×
Splenius	-	-	-		×
Sacrospinalis	-	-	-	-	✓
Iliocostalis	-	-	-	-	×
Longissimus	-	-	-	-	×
Spinalis dorsi	-	-	-	-	×
Semispinalis	-	-	-	-	×
Multifidus	-	-	-	-	×
Obliquus capitis inferior	-	-	-	-	×
Obliquus capitis superior	-	-	-	-	×
Rectus capitis posterior major	-	-	-	-	×
Rectus capitis posterior minor	-	-	-	-	×
Rotatores	-	-	-	-	×
Interspinales	-	-	-	-	×
Intertransversarii	-	-	-	×	
Trapezius	-	-	-	-	×
Muscles of the Neck.					
Scalenus anterior	-	-	-	×	
Scalenus medius	-	-	-	×	
Scalenus posterior	-	-	-	×	
Longus capitis	-	-	-	×	
Rectus capitis anterior	-	-	-	×	
Longus colli	-	-	-	×	
Rectus capitis lateralis	-	-	-	×	
Sterno-cleido-mastoid	-	-	-	-	
Muscles of the Thorax.					
Intercostales	-	-	-	-	×
Levatores costarum	-	-	-	-	×
Subcostales	-	-	-	-	×
Transversus thoracis	-	-	-	-	×
Muscles of the Abdominal Wall.					
Obliquus externus abdominis	-	-	-	×	
Obliquus internus abdominis	-	-	-	×	
Cremaster	-	-	-	-	×
Transversus abdominis	-	-	-	-	×
Pyramidalis abdominis	-	-	-	-	×
Rectus abdominis	-	-	-	-	×
Quadratus lumborum	-	-	-	-	
Muscles of the Perineum.					
Sphincter ani externus	-	-	-	-	×
Corrugator cutis ani	-	-	-	-	×
Transversus perinei superficialis	-	-	-	-	×
Bulbocavernosus	-	-	-	-	×
Ischioavernosus	-	-	-	-	×
Sphincter urethrae membranacea	-	-	-	-	×
Transversus perinei profundus	-	-	-	-	×
Muscles of the Pelvis.					
Levator ani	-	-	-	-	×
Coccygeus	-	-	-	-	×

Table IV.—DIVISION OF THE NERVES OF THE EXTREMITIES INTO DORSAL AND VENTRAL GROUPS.

ORIGIN		NERVES
<i>Upper Extremity.</i>		
Brachial Plexus.	Dorsal trunks (posterior cord)	<ul style="list-style-type: none"> Dorsal scapular Long thoracic Suprascapular Subscapular (2) Thoraco-dorsal Axillary Radial
	Ventral trunks (lateral and medial cords)	<ul style="list-style-type: none"> Nerve to subclavius Anterior thoracic (2) Museulocutaneous Median Ulnar
<i>Lower Extremity.</i>		
Lumbo-sacral Plexus.	Dorsal trunks	<ul style="list-style-type: none"> Superior gluteal Inferior gluteal Nerve to piriformis Femoral Peroneal
	Ventral trunks	<ul style="list-style-type: none"> Obturator Nerve to obturator internus and superior gemellus Nerve to quadratus femoris and inferior gemellus Tibial

This division of the nerves and, as naturally would follow, of the muscles of the body, is also to be found in part in Braus,⁴ Quain's *Anatomy*,⁵ and Lewandowsky.⁶ Indeed, the whole general notion of such a division was recognized to a certain extent by Thomas Huxley⁷ in 1871, in his description of the surfaces of the limbs and their axial borders. Since the functions of these muscles, particularly those of the limbs, are familiar to all, they have not been included in the tables. The difference between an expected function in terms of the dorsal or ventral origin of a given muscle and its real function has been emphasized briefly by citing the femoral group and the dorsal interossei. When this same critical examination of the correspondence between function and origin of muscles is applied to the hamstrings, for example, it is found that whereas they flex at the knee, they also extend at the hip—a curious combination. When the movements at the ankle are considered, it is found that the gastrocnemius and soleus group, though posteriorly placed in the leg, and though developing from what is really its ventral aspect,

have a dorsal function, extension. They are innervated by a ventral nerve which also innervates the flexors of the toes and the intrinsic flexors of the foot. The confusion which has resulted from this alone is tremendous. The attempts to reconcile function on one hand, with anatomy, embryology, and nerve-supply on the other, have led to insurmountable difficulties so far as any satisfactory solution is concerned. However, when in addition to actual movements of muscles, we consider their embryological grouping and their nerve supply, we find that all of these difficulties disappear.

In order to keep in mind this division of muscles, it is proposed that the words 'ventrad' and 'dorsad' be added when necessary to our present terminology to indicate the control and origin of muscle movements such as extension, flexion, abduction, etc.; the suffix 'ad' instead of 'al' is thus used to indicate that primitively these muscles produced movements to and from the ventral surfaces of the body. To be sure, all movements are not primarily such, but a group of movements such as flexion, internal rotation, adduction, and inversion obviously have the same general effect, while the movements of extension, abduction, external rotation, and eversion have the opposite effect.

In another paper⁸ emphasis is laid upon the fact that the movements of the leg in normal gait can be resolved into four phases: (1) A ventral fin-like movement at the hip; (2) A dorsal fin-like movement at the hip; (3) The flexion reflex element; (4) The support element.

The first two of these represent movements of the extremities of a vertebrate with but singly-hinged appendages, namely fins. When, in the course of vertebrate evolution, fish developed into land animals, amphibia, and acquired three-hinged appendages, more complex movements were necessary. The three-hinged appendage had not only to be locked in extension to counteract gravity, but had also to be withdrawn from the ground. Land animals therefore developed a more complicated integration of the nervous system to control this. These two latter sets of movements, which are corresponding opposites, include the two last elements of gait, those of flexion and support, and it is these which are made manifest in an uncontrolled fashion by the process of decerebration, either experimentally in animals or by disease in man.

The position of antigravity posture as defined by Sherrington^{9, 10} is spoken of as 'extension', while the flexion reflex element is spoken of as 'flexion'. The impression given, therefore, is that these two sets of movements are physiologically homogeneous, and the implication is that the nervous system bears a similar relation in controlling them. However, in the following it will be shown that both the

extension and flexion alluded to consist of an alternation of ventral and dorsal movements, not a simple and homogeneous reaction. These reflexes of posture and progression are, of course, guided by integrations of the spinal cord. Their make-up is obviously more complex than one which would simply guide the movements of a large ventral or dorsal group of muscles in a concerted fashion. The postural reaction of the trunk of the body in opisthotonus illustrates by way of contrast a simple over-activity of the dorsal group in relation to the ventral group.

III.—A NEUROMUSCULAR ANALYSIS OF THE EXPERIMENTAL AND CLINICAL EVIDENCE FOR DECEREBRATE RIGIDITY AND FLEXION REFLEX.

A. The Experimental Evidence.—In a paper entitled "The Reflex Mechanism of the Step", Sherrington⁹ has given the actual

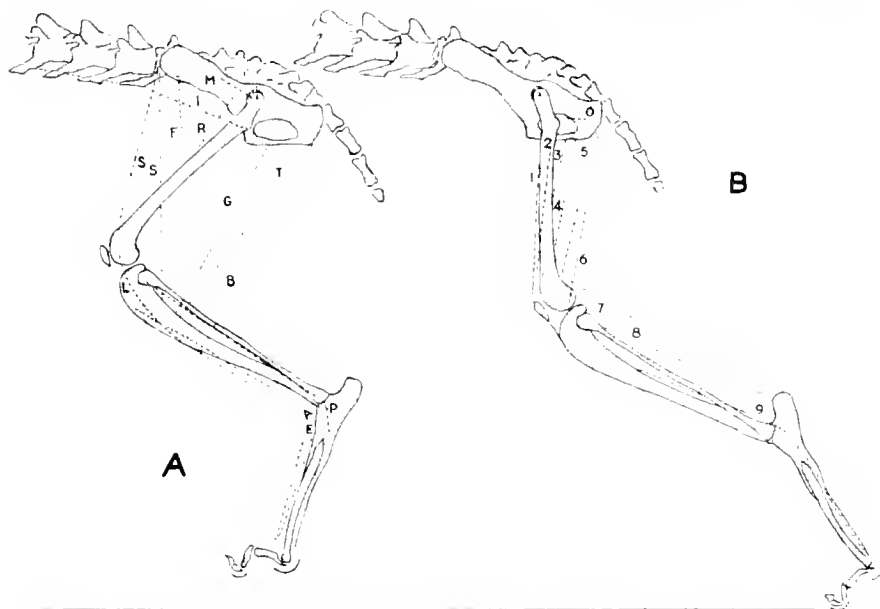


FIG. 1.—Figure illustrating the muscles actually observed by experimental analysis to be engaged in contracting in the flexion-phase (A) and in the extension-phase (B) of the reflex step of the cat.

- A. Tibialis anticus.
 B. Biceps femoris posterior.
 E. Extensor brevis digitorum.
 F. Tensor fasciae femoris brevis.
 G. Gracilis.
 I. Psoas.
 L. Extensor longus digitorum.
 M. Gluteus minimus.
 P. Peroneus longus.
 R. Rectus femoris.
 S. Sartorius lateralis.
 S'. Sartorius medialis.
 T. Semitendinosus.

0. Quadratus femoris.
 1. Crureus.
 2. Vasti.
 3. Adductor minor.
 4. Adductor major (a part).
 5. Semimembranosus.
 6. Biceps femoris posterior.
 7. Gastrocnemius.
 8. Soleus.
 9. Flexor longus digitorum.

(By permission of 'Brain'.)

Table I'.—THE ABOVE MUSCLES ARRANGED IN VENTRAL AND DORSAL GROUPS.

Note. In both tables *Group I* includes muscles acting at the hip, *Group II* those acting at the knee, *Group III* those acting at the ankle.
Fl. Flexion; *Ext.* Extension; *Ad.* Adduction.

GROUP	A		B	
	VENTRAL	DORSAL	VENTRAL	DORSAL
I.		1. Psoas M. Gluteus minimus R. Rectus femoris F. Tensor fasciae femoris brevis S. Sartorius lateralis S. Sartorius medialis	0. Quadratus femoris 3. Adductor minor 4. Adductor major (in part) 5. Semimembranosus 6. Biceps femoris	
II	B. Biceps femoris posterior G. Gracilis T. Semitendinosus			1. Crureus 2. Vasti
III.		A. Tibialis anticus L. Extensor longus digitorum P. Peroneus longus E. Extensor digitorum brevis	7. Gastrocnemius 8. Soleus 9. Flexor longus digitorum	

THE CORRESPONDING MUSCLES IN MAN.*

I	Pectineus (Fl. & Ad. hip)	Hipsoas (Fl. hip) Tensor fasciae femoris (Fl. hip) Sartorius (Fl. hip) Pectineus (Fl. hip)	Adductors (Ad. hip) Semimembranosus (Ext. hip) Semitendinosus (Ext. hip) Biceps femoris (Ext. hip)
II	Gracilis (Fl. & Ad. knee) Semitendinosus (Fl. knee) Semimembranosus (Fl. knee) Biceps femoris (Fl. knee)		Quadriceps femoris (Ext. knee)
III		Tibialis anticus (Fl. ankle) Extensor digitorum longus (Fl. ankle) Extensor longus hallucis (Fl. ankle)	Gastrocnemius (Ext. ankle) Soleus (Ext. ankle) Tibialis posticus (Ext. ankle)

*This does not account for all the muscles of the lower extremities, since observation or testing of all of them has not been possible.

muscles involved in the extension or antigravity phase of reflex stepping and in the flexion phase in the cat. *Fig. 1* represents the results⁹; following this is a table (*Table I'*) showing the division of muscles into dorsal and ventral groups, and below this, for convenience and future use, the corresponding muscles in man.

From this it is readily seen that there is a definite alternation of control at the three great joints, the hip, knee, and ankle.

Furthermore, in speaking of the muscles of the axis, Sherrington⁹ states that "when all of the brain in front of a transection between

anterior and posterior colliculi is removed in a cat or dog, the decerebrate preparation thus obtained exhibits a systemic postural reflex with the following features . . . the dorsal muscles of the back, neck, and tail, the retractors of the head, and the elevators of the lower jaw, are all in harmoniously co-ordinated steady tonic contraction."

From this it may be seen that the muscles of the extremities show an alternation from axis towards periphery at the knee and hip respectively, and, in addition, this alternation is carried on in the axial muscles in which the dorsal group is over-active. The formula, therefore, for the limbs in decerebrate rigidity, going distally, is VDV, and the formula for the limbs and axial musculature, the axial being most proximal, is DVDV. These letters refer respectively to axis, hip, knee, and ankle. This experimental evidence is clearly cut, and forms the basis of a conception of muscular pattern in decerebrate states, to be illustrated later by case reports. Experimentally this pattern is more clearly defined than would be expected in the less uniform effects of human pathological processes.

B. The Clinical Evidence for Decerebrate Rigidity.—The first clinical description of decerebrate rigidity was given by S. A. K. Wilson¹¹ in November, 1920, a quarter of a century after the first experimental description by Sherrington. Wilson showed that a great variety of disorders, such as cerebral abscesses and tumours, cerebellar tumours, intraventricular hæmorrhage, acute purulent meningitis and ependymitis, tuberculous meningitis, hydrocephalus, congenital diplegias, chorea, athetosis, and dystonia lenticularis, could cause a picture resembling this or fragments thereof. A few quotations from his paper will suffice to give the movements affected.

Case 1 (p. 223).—"The arms were extended by the sides, slightly flexed at the wrists and notably rigid. The legs were also extended and adducted, with toes pointed down and in."

"11.45 p.m. About this time both arms became rigid, the left rather more than the right. Both were adducted at the shoulder and strongly extended at the elbow, with pronounced internal rotation and hyperpronation; the wrists were flexed, so that the palms of the hands looked up and out, quite turned away from the body." (*Fig. 2.*)

"1.25 a.m.—When the patient was seen again, after about an hour's interval, he was in the same extensor position, arms adducted at shoulders, extended at elbow, flexed at wrist, whole arm rotated inwards and hyperpronated; on the right the thumb was between the first and second fingers of the hand, but not on the left. The legs were rigidly extended, feet inverted, great toes dorsiflexed."

Case 2 (p. 227).—"The whole of the musculature of trunk, arms and legs became rigid; the arms and legs were extended to the fullest extent, the arms by the sides and pronated, while the hands were clenched and wrists slightly flexed. The legs were slightly inverted, the feet more notably so, with the toes pointing down and in."

Case 3 (p. 228).—"The upper extremities were adducted and internally rotated, the forearms strongly hyperpronated, so that the backs of the hands faced each other: trunk and neck were extremely rigid and the latter slightly retracted: the legs were similarly in full extension, heels drawn up, toes pointing down and feet inverted."

Case 4 (pp. 229 and 231).—"A brief period of excitement and moaning ushered in the attacks, which consisted of sudden powerful opisthotonus and head retraction, the neck straightening and the occiput nearly touching the shoulders. The left arm relinquished its flexed attitude and became strongly extended, the forearm over-pronated, the wrist extended and the third and fourth fingers flexed, while the thumb was flexed into the palm. The legs were in fullest extension with heels up and toes down, and the right arm was as the left, except that it was rather less inverted and the hand was in the form of a fist. Trunk and limbs alike were absolutely rigid."

Case 5 (p. 231).—"March 6, 1906: The legs were now extended again, and so were the arms. The patient lay unconscious, with the arms extended by the sides and the forearms notably hyperpronated. The hands were clenched. The legs were also fully extended, with feet inverted and toes pointing down and in."



FIG. 2.—The typical decerebrate attitude of extension pronation.
(By kind permission of 'Brain'.

Case 6 (p. 233).—"The arms were fully extended, adducted, strongly hyperpronated: the backs of the hands faced each other, and at the same time the wrist and finger flexors were conspicuously contracted: the neck was stiff from muscular rigidity, but was not retracted in any degree: the lower extremities were in full extension and adduction, with heels drawn up, toes pointing down, and feet slightly inverted."

Case 7 (p. 235).—"His arms went out in front of him, extended and hyperpronated, with hands clenched and wrists flexed."

When these descriptions are compared with the tables of movement given by Sherrington and with *Tables I, II, III, IV, and V*, it will be seen that the formula D—axis, V—shoulder and hip, D—elbow and knee, and V—wrist and ankle and below, is clearly present.

The quotations from Wilson's paper were chosen to illustrate clearly-defined patterns. Many of his descriptions, as would be expected from the character of the pathological process, were not so

precise. The lack of clearly defined pattern in many cases appears to us susceptible of easy interpretation, as indeed has been suggested by Wilson. In the cases which follow we have fortunately been able to find a precise formula in all but one. In the light of the neuromuscular approach, these formulae become significantly indicative of curious and inexplicable patterns in other conditions.

C. The Clinical Evidence for the Flexion Reflex.—When the illustrations from Sherrington's article on "The Reflex Mechanism of the Step"⁹ are examined, it is seen that the flexor phase, or the flexion reflex element, forms a corresponding opposite to the anti-gravity position. "A complete flexion reflex consists of a single flexion at the hip and knee, with dorsiflexion of foot and toes."¹²

Reference to the tables added to these illustrations shows that the formula is D—hip, V—knee, D—ankle for the limbs, going distally, in contrast to the VDV of antigravity posture. Furthermore, it has been shown by Walshe,¹² Riddoch,¹³ and others that a well-marked contraction of the abdominal musculature occurs with the fully-developed flexion reflex. Therefore the formula becomes VDVD for the musculature of the limbs and trunk, and is in contrast to the DVDV formula of antigravity posture. These letters refer respectively to the axis, hip, knee, and ankle. *Case 5* described below (*Fig. 9*) illustrates this.

D. Summary.—From this it may be seen that, not only in decerebrate posture, but also in the corresponding opposite, the flexion reflex, an alternating formula exists in the extremities, which is not unexpected, after all, when one considers the optimum mechanical needs of appendages consisting essentially of three segments which must be folded up and extended. This alternation is also present when the axial musculature is included.

IV.—CASE REPORTS.

In the case reports given below, not only movements as such, but the rôle of individual muscles in causing these movements, have been repeatedly and most carefully observed. The axial movements, and all movements of the extremities, except those at the shoulder, are easy to analyze by observation and various clinical tests. Certain difficulties appear at the shoulder, due to the fact that both dorsal and ventral muscles bring about the same movement, notably internal rotation. These muscles are the pectorals of the ventral group, and the latissimus dorsi, subscapularis, and teres major of the dorsal group. However, it is very easy to palpate both the pectorals and the latissimus, and thus determine which of these large muscles is in action.

Case 1.—R. E. (Fig. 3).

History.—In October, 1919, at the age of 15, the patient was taken with a respiratory disorder manifesting itself as a cold and bronchitis, unassociated with expectoration. She complained of pain in the chest. She was treated at various hospitals and dispensaries. The respiratory symptoms cleared up, but the pain remained for almost a year, until Sept. 25, 1920. At that time she had been suffering from excessive drowsiness for a month. She complained of diplopia, headache, fever, drooping of the right eyelid, and dragging of the left foot. At Christmas, 1920, choreiform movements in the legs began which prevented her from sitting still. Two days later similar movements appeared in both hands, and, two days after that, in the neck and head. By this time the diplopia had disappeared, though



FIG. 3.—Note the adduction at the shoulders, the decerebrate position of the left arm, and the adduction at the hips.

ptosis and dragging of the left foot still persisted. On Jan. 21, 1920, she was admitted to Bellevue Hospital, where she remained for five months. Three months after admission the ptosis disappeared. While at Bellevue the movements were those seen in the kinetic form of decerebrate posture. A precise analysis of the muscles involved was not made at that time. It was noted then that the functional element was large. The underlying process, however, was felt to be epidemic encephalitis. After discharge from Bellevue and a brief stay at the Metropolitan Hospital, she was admitted to Montefiore Hospital, Sept. 29, 1921.

Physical Examination.—At the present time examination shows bilateral ptosis, nystagmoid oscillation in the lateral plane, and weakness of the lower facial muscles on the right. Standing unassisted is impossible. There is no other involvement of the muscles supplied by the cranial nerves except the spinal accessory, which will be described under axial musculature.

Iris.—There is definite arching of the body with retraction of the head, simulating typical opisthotonus. She has shrugging movements of the shoulder which are produced by the action of the trapezius. The sterno-cleido-mastoid on the right contracts occasionally.

Upper Extremities.—The arms are adducted and rotated inwardly, and the pectorals can be felt to contract when this movement occurs. There is no contraction of the latissimus, the deltoids, rhomboids, or spinati muscles. The forearm is extended on the arm by the triceps, and the wrist is pronated and flexed. While at Bellevue it was noted that the fingers were consistently flexed and adducted during the movements, while here the first finger is extended. The present finger movements imitate classical athetosis.

Lower Extremities.—In the lower extremities there is a constant movement of what appears, on first analysis, to be flexion, and what really is a spasmodic adduction, of the thighs due to definite contraction of the adductors. Occasional contraction of the pectineus is felt (supplied by both

dorsal and ventral nerves). When the legs are abducted there are active adductor movements which bring the legs to the mid-line. During this movement flexion at the hip does not occur. The iliopsoas, sartorius, tensor fasciae latae, and glutei do not contract. When the patient is on her abdomen and the knee is flexed at right angles, rhythmic extension movements produced by the quadriceps occur. When she is on her back the hamstrings can be felt to contract. This does not produce flexion at the knee, but rather slight extension at the hip. Rhythmic movements accentuate a rather mild equinovarus position. The toes are flexed in this movement.

Summary.—Of the muscles which could be tested, the following are found active and producing movements:—

1. AXIAL

Extensors of the head, neck, and back

Trapezius

Right sterno-cleido-mastoid

2. APPENDICULAR

a. Upper extremity

1. Shoulder Pectorals

2. Elbow Triceps

3. Wrist Flexor group

Pronators

4. Fingers Long flexors

Extensor indicis proprius

Adductor and flexors of the thumb

Volar interossei and lumbricales

b. Lower extremity

1. Hip Pectineus

Hamstrings

Adductors

2. Knee Quadriceps

3. Ankle Gastrocnemius

Soleus

Tibialis posterior

4. Foot Long and short flexors

Abductors

With the exception of the sterno-cleido-mastoid, only dorsal axial muscles come into play. Movements at the shoulder and hip are brought about by ventral muscles, those at the elbow and knee by dorsal muscles, those at the wrist and ankle by ventral muscles. In the fingers and toes the movements are ventral except that of the extensor proprius.

Diagnosis.—Epidemic encephalitis, choreic and kinetic type.

Case 2.—L. R., age 13 (*Figs. 4 and 5*).

History.—The patient was admitted to the Montefiore Hospital on April 8, 1922. The history obtained from the mother was that the child had not been well for about two years. She was irritable as a rule, easily disturbed, and fainted frequently. The mother believes she may have been feverish at times. There is no history of diplopia (?) In February, 1922, she was brought home because movements of the limbs, head, and trunk had begun. After staying a month in another hospital she was admitted to Montefiore Hospital.

Physical Examination.—On first sight she presents the picture of chorea. The arms, legs, and head are moving almost continually. The

duration of the movement is less than a second when timed by a stop-watch. More careful observation shows that certain definite groups of muscles are brought into activity, thus producing a continual repetition of the same postural patterns. When the patient is asleep there are no abnormal positions or postures. With the exception of the movements noted, the physical examination is quite negative. The cranial muscles are negative except for those supplied by the spinal accessory, which will be mentioned below.

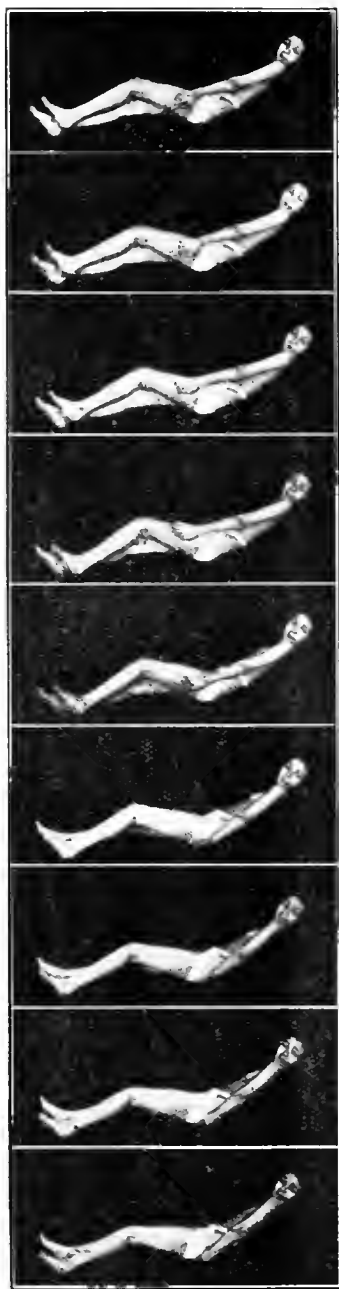


FIG. 4.

Iris.—The extensors and rotators of the head bring about retraction and rotation. Slight opisthotonic movements are occasionally noted. When the patient is more excited, these movements become more pronounced. The trapezius and sterno-cleido-mastoid are occasionally contracted on both sides. With the exception of this latter muscle, no activity of the ventral muscles of the axis has been noted.

Upper Extremities.—When the patient is relatively quiet, the pectoral group at the shoulder adducts and internally rotates the entire arm. As the series of moving pictures shows (Fig. 4), this movement alternates with one of rest. At the elbow the triceps extends the arms. At the wrist the flexors are in action as well as the pronators. The flexors of the fingers and thumb, as the photograph (Fig. 5) and moving picture show, are also in action.

It may be seen from this that there is an alternation of activity of ventral and dorsal muscles, the formula of which is at the shoulder ventral, at the elbow dorsal, at the wrist and below ventral.

Lower Extremities.—The legs are carried forward and across the mid-line by the ventral adductor group. The iliopsoas is not in action, as can be plainly made out on examination. When the legs are widely spread, flexion at the hip is not seen; instead, the legs are adducted. Extension at the hip by the hamstrings is also present. The gluteal group of muscles is not in action except when the axial muscles are bringing about opisthotonus. At the knee the hamstrings produce no flexion; on the contrary, the dorsal quadriceps group extends. At the ankle the gastrocnemius and soleus and tibialis posticus produce extension, and the

flexors of the toes are active. As reference to *Table III* will show, this last is entirely a ventral action.

The formula for the leg is therefore identical with that of the arm—at the hip ventral, at the knee dorsal, at the ankle and below ventral. When the patient's movements become excessive owing to excitement, the pattern ceases to be so precise, and other muscles begin to contract. These muscles are the antagonists of those noted above. This is a relatively rare occurrence.

Summary.—The patient shows activity of the dorsal musculature of the trunk, and an alternating formula for the extremities. The only exception is the sterno-cleido-mastoid. Occasionally the antagonists of these muscles go into action.

Diagnosis.—Epidemic encephalitis, choreic and kinetic type.



FIG. 3.

Case 3.—J. S., age 17 (*Figs. 6 and 7*).

History.—This patient was admitted to the Montefiore Hospital on May 1, 1922. She has had a rather stormy career, but despite family opposition had worked hard in pursuing her studies at high school. She graduated in January, 1920. She then studied at a business school, graduating at the head of her class. She began stenography, and since has done exceptionally well.

Between January and July, 1920, she began to feel tired and sleepy during the day, and restless at night. She could not sleep well. In July, 1920, she went to the country, but did not improve, and so returned home after two weeks. In August, 1920, she had pains in her legs, with fever, lasting one week. In January, 1921, there occurred a family quarrel centred about a sexual affair, and followed by a disturbed night. In the morning she noticed movements of the hands, feet, and head. She could not talk. Some improvement occurred, but two days later diplopia and fever were present. She soon became delirious, and was admitted to the Lenox Hill Hospital, where she stayed three months. After a stay in the country her general condition improved. In May, 1921, after an attack of vomiting associated with abdominal pain, she was admitted to Bellevue. Following this her movements were intensified, and she was admitted to the Neurological Institute, where she remained nine weeks. There was considerable improvement, but she continued to attend the dispensary until February, 1922. In March, 1922, she entered Mt. Sinai with abdominal pain and depression. She became very noisy and excited, and was occasionally confused, especially at night. She finally left the hospital and was admitted to Montefiore Hospital May 13, 1922.

Physical Examination.—On first observation the patient's condition suggests chorea. The extremities and head are moving continually. These movements are not so pronounced when quiet and unobserved. The emotional reaction resultant upon examination intensifies the movements. Careful observation shows that the activity of certain groups of muscles predominates and produces a repetition of the same postural pattern.

Cranial Nerves.—When the patient is quiet, the motor cranial nerves are also at rest. When excited, there is frequent grimacing, the tongue is protruded straight forward and to the right and left.

Axis (Fig. 6).—There are opisthotonic movements. The head is pulled backward, the spine is curved. The patient states that sometimes



FIG. 6.



FIG. 7.

this begins at the neck and passes wave-like to the end of the body. At other times either the neck region or the lumbar region is alone affected. The trapezius is found active on both sides, but more so on the right. It elevates the shoulder at times. The sterno-cleido-mastoid on the right is sometimes in action, though rarely. The lower ventral trunk muscles (abdominals) occasionally contract, but never bring the body forward.

Upper Extremities.—Some of the shoulder muscles are active. The scapula is moved out and up. On analysis this is found due to the trapezius and to internal rotation by the pectorals. The deltoids and rhomboids are never in action. Occasionally a contraction of the latissimus dorsi is observed. The triceps is almost always contracted, the elbow flexors are rarely so. Flexion occurs at the wrist, though extension is also observed at times. Pronation is frequently noted, but supination also

occurs, though less often. When extension is present supination is noted also. The fingers do not show as typical or as constant a response as that which occurs in *Cases 2 and 4*.

Lower Extremities.—The dorsal muscles at the hip do not take part in any of the movements. The patient states that her leg is never carried forward, either when standing or in bed. None of the following muscles contract in any of the movements: iliacus, psoas major and minor, pectineus, sartorius, and tensor fasciæ latae. The glutei do not contract while standing or when on the abdomen or back. The adductors are powerfully active, and may be felt when prone, supine, or standing. This movement appears one of flexion, but is not in the dorsoventral plane but at an angle tilted towards the mid-line. When the patient is on her abdomen, extension at the hip is produced by the hamstrings, while the glutei are definitely relaxed. The patient states that her leg is twisted inwards (inwardly rotated). She does not confuse this with inversion of the foot. The leg is continually held in extension, and never when standing or prone goes into flexion. The feet are inverted, the right one more so than the left, and extended so that the dorsum of the foot is almost in a straight line with the long axis of the tibia. When standing, both feet are inverted, the right much more than the left. When walking, the external lateral border of the foot is turned to the ground owing to inversion (*Fig. 7*). This can be momentarily overcome, but immediately returns.

Summary.—In this case of epidemic encephalitis there is a well-defined picture showing a rhythmic recurrence of opisthotonus and the antigravity posture. When the patient is quiet this is easily made out. When excited there is overflow into the opposite pattern, though even then it occurs much less frequently than that of the antigravity posture.

Diagnosis.—Epidemic encephalitis, choreic and kinetic type.

Comments on Cases 1, 2, and 3.—The diagnosis in the three cases is epidemic encephalitis of the kinetic and choreic types. It is extremely interesting that at one time or another each of these three cases was diagnosed as hysteria. The hysterical element, or what might better be considered functional overflow, is marked. Were it not for the findings in the case of R. E., namely, paresis of one leg, persistent and partial ptosis of both eyelids, diplopia, nystagmus, headache, and fever; for the prolonged illness in L. R., with fever and delirium; and the insomnia, fever, diplopia, and intestinal and bladder disorders in J. S., these three patients could be considered as hysterics. However, it is now well known that the lesions of epidemic encephalitis not only produce pictures which are subject to great exaggeration by mental factors, but that the disease may be practically latent until mental shocks occur. There is no difference, in the effect of physical and psychic trauma in bringing this disease to light, from what familiarly occurs in diseases of the nervous system, such as paralysis agitans and tabes dorsalis.

The Muscular Element.—In all three cases the muscles involved in producing the patterns described were almost identical. Indeed, if it were not for a few exceptions, the descriptions of any one of the

three cases would fit the others. In all of them the dorsal axial muscles were instrumental in causing movements. In all of them the muscles described by Sherrington, and then by Wilson, as producing patterns of decerebrate posture, were in action. It is extremely interesting that those muscles which are engaged normally in maintaining an erect posture should appear as clearly as they did. The formula for the arms and legs was, in all three cases, ventral movements at the hip and shoulder, dorsal movements at the knee and elbow, and ventral at the wrist, ankle, and below. In addition, the ventral axial sterno-cleido-mastoid muscle was active in all three cases. We are unable to explain this to our satisfaction, but feel that it may have to do with separate control by the nervous system of cephalo-rotatory movements. Further study of this matter will have to be made.

The alternating formula VDV of the extremities was complicated in *Cases 2* and *3* by the appearance of a reverse formula, DVD. Occasional abduction of the arm and flexion of the elbows was seen (*Cases 2* and *3*). More frequent than this were movements of extension and supination at the wrist (*Case 3*). These movements were carried out by dorsally innervated muscles. Further discussion of this flexion reflex formula in the arm appears in Section V.

The movements of the fingers in L. R. and in R. E. in the earlier periods of their illness were definitely flexor. Later on, some of the finger movements involved extension at the metacarpophalangeal joints. In J. S., movements of extension and flexion were somewhat mixed. That this was not unexpected will be later referred to in Section V, where the finger movements in both the antigravity and flexion reflex arm postures receive more attention.

Case 4.—Herbert S., age 28 (*Fig. 8*).

History.—The patient, a cutter, was admitted to Montefiore in April, 1921, and died in October, 1921. He was admitted with the following history. Following a 'cold' in October, 1920, which was associated with gastro-intestinal symptoms, there occurred thermo-hypæsthesia in the lower extremities. Both legs below the knees felt cold when taking a warm bath. A week later stiffness of the left leg occurred, and the next morning dribbling of urine. He then entered the Neurological Institute, and after three weeks noticed some improvement. Soon after, fever developed— 101° to 104° —associated with swelling of the left elbow. This lasted three weeks. Following this he was unable to walk or stand, though he could move his feet in bed. At this time the sphincters were more severely involved, with bladder incontinence and retention of feces. Two weeks prior to admission he again had a temperature for two days, and could not move either his arms or his head. This was associated with pain in his left shoulder and side.

Physical Examination.—The patient is confined to bed and unable to move unaided. The motor cranial nerves are normal. There was, however, in a previous examination, slight right central facial palsy. The head

is rigidly maintained in a normal position when lying down, but when sitting up he can both hold it up and move it in all directions. He is unable to maintain a sitting position by himself, owing to paralysis of the axial musculature.

Upper Extremities (Fig. 8).—Voluntary movements in the upper extremities are lost, with the exception of movements which carry the arms from a horizontal position upwards from the bed. Flexion and extension of the fingers of the right hand, and flexion of the fingers in the left hand are also absent. The arms are rigidly contracted. The pectoral muscles pull the arms forward to the chest. They are very hypertonic. The arms are held extended on the elbows by the biceps on both sides. On the right the biceps shows normal tone, while on the left it is extremely hypertonic. On the right the forearm is pronated so that the ulnar border of the hand faces directly upward. On the left this pronation is only carried to an angle of 45° to the horizontal plane. On the right the wrist is flexed to a right angle. The fingers are forcibly extended at the two terminal phalangeal joints. When flexed by the examiner they returned to the extended position with an elastic-like bound. The thumb is adducted and slightly flexed at the proximal joint. The fingers are adducted. The left hand is *extended* at the wrist, nearly at right angles, while the fingers are flexed at the first interphalangeal joint. The gradation of flexion passes from about 5° at the index finger to 90° at the little finger. The thumb is flexed at the proximal joint and adducted into the palm. The position of the left hand is much like that due to the associated movements resultant upon making a fist, that is, flexion at the fingers and extension at the wrist.

Lower Extremities.—These are both rotated so that the lateral plantar borders of the foot rest upon the bed. They are flaccid, and present only the defects due to loss of tone and voluntary power, notably flexion of the toes and of the sole of the foot, with extension at the ankle (pes cavoequinus).

Sensation.—Lost from the third dorsal segment downward.

Reflexes.—The jaw-jerk is extremely lively. The deep reflexes are not obtained in the arm. The abdominal reflexes are absent. The knee-jerks are diminished.



FIG. 8.

Throughout the examination the patient showed 'flexor spasms' of the legs. The slightest stimulus caused this retraction. It has been necessary to hold the patient's legs down by a sheet to prevent these seizures. Once during the examination, reflex priapism was noted. Control of the bladder is lost.

Spinal Fluid.—This shows the following: increased pressure; globulin +++; flocculent precipitate; reduction to Fehling's diminished; cells 70.

Wassermann.—Blood and spinal fluid negative; blood culture and spinal fluid negative.

Urine.—Negative.

Summary.—The patient presented a varying course, and finally died a bulbar death. He ran a septic temperature throughout his stay in the hospital. A diagnosis of severe infective meningo-encephalomyelitis was made. The flaccidity of the legs and the sensory changes from the third dorsal segment downward, coupled with the reflex spasm, reflex priapism, and reflex incontinence, indicated a very severe lesion in the upper dorsal cord. The extremely spastic paralysis of the arm muscles, the transient facial palsy, and rigidity of the neck indicate that the process involved higher portions of the neuraxis.

Comments.—We have used this case to illustrate a static hypertonic condition in the upper extremities, showing difference in posture on the two sides. Though the condition of the lower extremities is pertinent to the subject of this paper, we shall leave a discussion of this matter for the next case. The points which we wish to emphasize are that: (1) The state of the upper extremities was unchanged for a considerable length of time. (2) No choreic movements were present. (3) The asymmetry in the two hands, as showing in *Fig. 8*, was very striking. It indicated that the process must have involved slightly different centres as far as the forearm and finger muscles were concerned. On the side in which pronation was most marked, flexion of the wrist was complete. On the side where pronation was relatively slight, extension at the wrist was present.

Case 5.—Harry S., age 36, metal worker (*Fig. 9*).

History.—The patient was admitted Sept. 29, 1921, to Montefiore Hospital, complaining of weakness in both limbs, constipation, and difficulty in passing urine. In August, 1919, he complained of 'stomach trouble', which consisted of pain in the 'stomach' and a feeling of a constricting band around the abdomen. In May, 1921, he noticed pain in the knees, which in a few weeks crept upward to his hips. It was more intense on the left than on the right. This pain remained, and in July he experienced what he describes as a 'freezing sensation and pins and needles' in the soles of his feet. Simultaneously weakness was noticed. A lumbar puncture was done, after which he lost the power of using his legs completely. Urgency of urination appeared, as well as constipation, more marked than before. In the early part of August his legs began to stiffen in extension, and grew progressively worse.

Physical Examination.—On admission, the cranial nerves were negative. The deep reflexes in all the extremities were exaggerated. The upper abdominals were present, the left lower easily exhausted and the right not

obtainable. There was marked spasticity of the lower extremities. Knee- and Achilles-jerks were hyperactive. There was bilateral ankle-clonus, with a Babinski on the left, questionable on the right. Sensory loss from D7 downward existed. He always lay with the lower extremities in extension until after the operation performed by Charles Elsberg on Nov. 26, 1921. After the operation the abdominal muscles contracted, the thigh was flexed on the hip. The muscles taking part in the contraction were the whole femoral group. The foot was at right angles to the leg (*Fig. 9*), the entire picture representing the flexion reflex described by Walshe¹² or the nociceptive reflex of Sherrington,⁹ or paraplegia in flexion described by Babinski. Knee- and ankle-jerks were active.

Part of Elsberg's operative notes follow: An extradural tumor was found lying mostly on the the posterior aspect of the dura and extending beneath the 4th, 5th, 6th, 7th, and 8th dorsal vertebrae. A large amount of it was excised, but fragments remained in various places in front of the



FIG. 9.

dural sac. There was no doubt that there was more tumor below the parts exposed.

Diagnosis.—Endothelioma (?).

Comments.—This patient showed typical hypertonic paraplegia in extension before operation, and typical hypertonic paraplegia in flexion after it. The increase of tone was as great after the operation as before. This indicates clearly that tone flows into pattern. Pattern changed in this case from that of the antigravity reflex to that of the flexion reflex. The tumour being cervical, it must have damaged the control of *lower* integrations. This indicates that the pattern of decerebrate posture of the legs must be carried out by neurones lying within the spinal cord. The presence in the legs of decerebrate rigidity is almost an exact counterpart of an experimentally-produced picture. Why the corresponding opposite pattern developed after operation is not clear. The case illustrates the

successive static fixation of two spinal patterns of opposite muscular formula.

V.—THE FLEXION REFLEX POSITION IN THE ARM.

Up to now emphasis has been laid upon the formula for the legs in the corresponding opposite positions of antigravity posture and the flexion reflex. This has been examined in the light of the experimental work of Sherrington and the clinical work of Wilson and ourselves. For the arms, the formula for the position corresponding to the antigravity position in the legs has been illustrated in the case reports and discussion. However, the position in the arms which would correspond to the flexion reflex element in the leg has not been defined. This, as would be expected, would present a formula opposite to that of the decerebrate arm—notably, dorsal at the shoulder, ventral at the elbow, and dorsal at the wrist. In the course of our investigation of this matter a lengthy paper by Riddoch and Buzzard,¹⁴ which considered this subject, came to our attention. They describe a flexion reflex of the upper limb as follows: "The reflex response, for which the convenient term is 'flexion of the upper limb', was readily obtained in No. 5. On scratching the palm of the paralyzed hand there occurred *flexion of the fingers*, wrist, and elbow, slight abduction and external rotation of the upper arm, and elevation of the shoulder. These were the main components of the general response, which varied in details according to the situation of the stimulus within the receptive field" (p. 434). However, in another place (p. 421), in describing associated movements following stimulation, the effect upon the upper limbs is given as follows: "The upper limbs became rotated outwards at the shoulders, flexed at the elbows, *extended at the wrists with slight supination of the forearms*; the fingers became extended at the metacarpophalangeal joints and flexed at the interphalangeal joints, while the thumbs were extended and abducted".

An analysis of this long paper will not be made here. Suffice it to say that, if the formula for the 'extension reflex' or the antigravity posture is VDV, as is indicated clearly by the findings of Wilson, Riddoch and Buzzard, and ourselves, it would be presumed that the corresponding opposite to this would have an opposite formula and would conform to the movements described in the quotation last given. It would be expected that there would be abduction at the shoulder, flexion at the elbow, extension at the wrist and at the metacarpophalangeal joints. This brings up a matter of considerable importance in the analysis of reflex patterns of the limbs which bears not alone on the question of the upper extremity, but also upon the Babinski reflex and its associated phenomena in the lower extremities. The Babinski phenomena will be given special consideration in another paper.

The intrinsic muscles of the hand are all of ventral origin. Adduction and abduction of the fingers, extension at the phalangeal joints, abduction and adduction of the thumb and little fingers, are all brought about by these ventral muscles. When, therefore, there occurs activation of a pattern which demands a dorsal reaction in the long muscles acting on the wrist and fingers, and when the impulse activating this pattern flows into the intrinsic muscles of the hand, no dorsal intrinsic muscles are there. In the antigravity position the long flexors of the wrist and fingers *and* the intrinsic muscles of the hand are activated (ventral muscles). In the flexion reflex element the long extensors of the wrist and fingers (dorsal) are activated, while the intrinsic hand muscles (ventral) are not. This last produces extension at the wrist, extension at the metacarpophalangeal joints, abduction of the thumb, and, in some instances, extension of the phalanges. Contraction of the extensor digitorum may produce this, depending upon the strength of the stimulus. Consequently the typical picture may include either extension or flexion at the phalangeal joints. The long flexors of the fingers are not active in producing flexion, the volar interossei and lumbricales are opposed by the extensor digitorum communis, the adductor of the thumb by the short and long abductor.

The postural pattern of the flexion in the hand consists therefore of dorsal activity at the shoulder, ventral activity at the elbow, and dorsal at the wrist and fingers.

At the shoulder the large number of dorsal muscles makes it possible to have a number of different reactions. The following from Riddoch and Buzzard¹¹ indicates the appearance of the reaction which we have just defined, and also the possible variations: "The movement most commonly obtained consists of adduction and external rotation at the shoulder, flexion at the elbow, and extension of the hand and fingers, but the response varies in a remarkable manner with alternation in the locality of the stimulus. Thus, when the reaction is excited by scratching the palm of the hand, the movement at the shoulder is abduction and retraction of the upper arm. Stimulation of the back of the forearm yields adduction at the shoulder, and of the inner aspect abduction at this joint. Again, when the stimulus is applied to the skin over the deltoid, the response is mainly strong elevation of the shoulder with adduction and external rotation of the upper arm" (pp. 437, 438). This emphasizes the variations found.

The pattern which we have described appeared in *Case 3* (J. S.). It occasionally followed or alternated with the antigravity posture. This represents the alternating stepping movements (reflex walking) produced experimentally by Sherrington. It has also been seen in

a man suffering from spastic tetraplegia, shown at autopsy to be due to pressure upon the lower brain-stem of an apricot-sized aneurysm of the right vertebral artery.

In the movements of athetosis, dystonia lenticularis, and chorea, these patterns, often fragmentary, can be made out, as Wilson has emphasized. The positions sometimes change so rapidly that it is only by means of successive cinematographic pictures that the analysis can be made.

VI.—THE RELATION OF POSTURE PATTERNS TO TONE.

In this paper it is assumed, that not only the integration which produces the flexion reflex, but also that producing the corresponding opposite pattern, notably the pattern of antigravity posture or reflex standing, is entirely spinal. In order to defend this assumption it will be necessary to consider some of the experimental work undertaken in producing decerebrate preparations. Sherrington⁹ states: "This reflex standing disappears when the transection of the brain is made behind the posterior edge of the pons", and "the experiments of Horsley¹⁵ and Thiele show that decerebrate rigidity is hardly seriously impaired by successive sections of the cerebellar region until the paracerebellar nuclei are invaded". Wilson,¹¹ in his paper on decerebrate rigidity in man, states in discussing the pathogenesis of this condition: "In the first place there is general agreement that decerebrate rigidity makes its appearance after transection of the neuraxis at the level of the anterior colliculi, and disappears by a second section below the neuronie level of the medulla". Sherrington⁹ has stated: "When in the dog the spinal cord is severed in the thoracic region, the hind-limbs cannot at first stand: but after lapse of weeks or months they exhibit this power. That is, with hind-feet on the ground the reflex tonus of limb-extension suffices to bear the weight of the limbs and superincumbent hind-quarters. The attitude thus exhibited indubitably amounts to standing, and is sometimes maintained for minutes at a time".

It would appear from these four quotations that, in the first place, removal of the central nervous system down to a point "behind the posterior edge of the pons" still permits the existence of reflex standing or antigravity posture, and the fourth quotation above indicates that this same reflex position may be obtained in an animal whose cord has been transected in the thoracic region. It is furthermore true that *no difference results in the pattern obtained when the brain is transected successively from the anterior colliculi to a "point behind the posterior edge of the pons"*. In other words, no change in pattern is produced by such successive removals of brain tissue. When a section is made below the point at the posterior edge of the

pons, or, to use Wilson's words, the "neuronic level of the medulla". the rigidity disappears. But this is due to a transitory loss of tone, as has been suggested by both Sherrington and Wilson, caused by the removal of the grey matter in the regions between the pontine section and the spinal section. However, as the above quotation of Sherrington notes, after a lapse of time the antigravity posture pattern reappears, even in decapitated animals.

Since the pattern definitely exists when all portions of the brain stem above the pons are removed, the neurones producing it and released by the removal of higher centres must lie in the intact portions of the nervous system, that is, in the spinal cord and small portions of the medulla. A further proof of this is that section of the cord at the thoracic level allows the same antigravity pattern to remain in the segments below.

Tonic influences which activate muscles in this particular pattern appear to lie both in the medulla and in the afferent fibres of spinal nerves. If either or both of these influences are removed, there ensues a period during which the pattern disappears and flaccidity results. However, the following quotation from Graham Brown¹⁶ indicates that proper stimulation from above may still activate the pattern: "The reactions (of decerebrate attitude) may occur many months after division of the dorsal spinal roots of the arm. That is to say, appropriate stimulation in the region of the mid-brain may evoke an extensor postural tonus or a flexor postural tonus. Sherrington has found that the decerebrate rigidity which occurs after removal of the cerebrum does not occur in a 'de-afferented' limb, but the fact that a condition which at any rate very closely resembles this state may be evoked in such limbs seems to point to the conclusion that the absence of this postural tonus in the decerebrate 'de-afferented' animal is due to the failure of the ascending impulses from the limb which normally play—however, indirectly—upon these mechanisms of the mid-brain, and that the mechanisms themselves, if properly activated, are still able to induce the tonus".

Pattern and tone constitute two different entities in the nervous system. Tone is the common factor of hypertonic states, and activates muscles in various patterns. The experiments of Graham Brown (decapitation and de-afferenting) indicate this. When tone is removed, the pattern, like a picture on the wall of a dark room, is not seen but is none the less there in spite of the fact that it is not activated. In brief, tone flows into moulds of patterns much as an electric current does. Just as a galvanic current activates flaccid muscles, so does tone, but in addition, it activates them in pattern.

From a consideration of the muscles involved in the flexion and extension phases of gait, as shown by Sherrington, and from all the

work on reciprocal innervation, it would be assumed that the neurones for the flexion reflex integration and the reflex standing integration, being corresponding opposites, would be located in the same portions of the nervous system.

From the point of view taken in this article, based upon a neuromuscular conception of movements, the same conclusion can be drawn. From an evolutionary point of view a similar hypothesis must be formulated. When, in the course of evolution, an animal with singly-jointed, fin-like appendages developed appendages with three joints showing the corresponding opposites, the reflexes of flexion and of antigravity posture, it would be natural to assume that the neurones regulating these two newly-appearing reflex activities would lie in the same portions of the nervous system.

VII.—THE KINETIC AND STATIC TYPES.

The spinal neurones must be activated, or no pattern would be present at all.

In the kinetic types described, the choreiform movements produced the patterns with great consistency. The muscles of the opposite group contracted occasionally (*Cases 2 and 3*). In some cases the kinetic impulse, flowing into lower centres, may produce an apparently patternless picture, as is frequently seen in chorea. These movements, due to their speed, are patternless on ordinary observation, but can, by means of analysis by successive moving pictures, be resolved into definite patterns. In our cases an integration having a clearly definite pattern was exposed to the kinetic impulse. When the opposite of this pattern was activated, it indicated that corresponding opposites were both exposed to the kinetic impulse. Indeed, in reflex stepping we see such a combination beautifully illustrated. Since these opposites constitute a pair of neurone arrangements of the same phylogenetic age, it is natural to find them closely associated.

In the purely spastic variety, *Case 4*, it was found that the tone overflowed not only into those muscles which determined the pattern (triceps), but also into the opposing muscles (biceps). Nevertheless the pattern remained. It would appear, therefore, that though this tone was distributed to antagonists, *it was distributed subject to pattern. This serves to emphasize the fact that tone flows into pattern and constitutes a separate entity in the nervous system.*

VIII.—SUMMARY AND CONCLUSIONS.

Abnormal movements and positions are customarily described as such without naming in addition the muscles which produce them. There the matter is allowed to rest for all practical purposes—"the

arm and hand are flexed"—“the arms are adducted, the elbows extended, the wrist and fingers flexed”. True, certain formulæ for movements exist, such as the flexion of the arm and the extension of the leg of hemiplegic contracture, but the *anatomical relations* of the muscles and nerves causing such groups of movements have never been seriously considered in clinical neurology. Therein lies an error of omission. To draw conclusions about the nervous system from descriptions of movements and positions alone is an error of commission.

In this paper it has been shown that there is a well-defined grouping of nerves and muscles under integrating control of the spinal cord, and that it is on the basis of this grouping that formulæ expressing disease in certain parts of the central nervous system of man must be built.

The question of classification of spinal integrations is too lengthy to append here. Suffice it to say that the dorsoventral integrations of the axis (opisthotonic, emprosthotonic) and appendages (rod-like movement of the leg in walking), and the alternating VDV-DVD integrations of the appendages, are those concerned in stepping.⁸ In these formulæ the three initials describe respectively the type of movements at the hip and shoulder, knee and elbow, wrist and ankle and below. The alternating formula VDVD-DVDV, which includes both the axis and appendages, is made manifest by decerebration, as we have shown.

To say, in describing the antigravity posture of decerebration, that the leg is *extended* at the hip, knee, and ankle, the foot *adducted*, and the toes *flexed*, gives no notion of plan or order. To say that there is *adduction* at the shoulder (though *extension* at the hip), *extension* at the elbow, *flexion* and *pronation* at the wrist (though *extension* at the ankle), gives no notion of plan or order. When the facts relating to the grouping of nerves and muscles, not of movement alone, are inserted into the analysis, it is found that the leg and arm formulæ are the same—VDV—and there appears a simpler plan.

Similarly, when the corresponding opposites are considered, the so-called ‘flexion reflex’ of the arms and legs, there results the same confusion from a consideration of movements alone. The lower limb is *flexed* at the three great joints, the toes are *extended*, the arm is *abducted* (though the hip is *flexed*), the elbow *flexed*, the wrist *extended* (though the ankle is *flexed*). Here again clearness results from using what is really old information, the greater part of which may be found in such text-books of anatomy as Quain⁵ and Cunningham³. The formula for both arm and leg is DVD, and is opposite to that of the antigravity posture.

The integrations of the spinal cord have clearly defined patterns.

By virtue of their activity certain muscles always act together and in the same general way. Their activity may be recognized not only by inspection and palpation, but by changes in position.

The activating forces of these patterns are two—one kinetic and the other static. The latter is familiarly spoken of as tone. Either of these forces activates muscles in clearly defined patterns, provided that a group of integrating neurones is completely released. When a particular integration is patchily involved, such pictures as those of *Case 4* result. In any event, neurones causing pattern and neurones causing tone are not the same.

From the points of view of the physiologist and the pathologist, it is of some importance to recognize that the pattern for the trunk and appendages in decerebration is resident within spinal neurones. It represents the highest spinal integration. The fact that it may appear when lesions are produced as high as the anterior colliculi makes it seem probable that, between that level and the upper level of the spinal cord, posture patterns for the trunk and appendages as such, and different from those of the spinal cord, do not exist. These high lesions simply release the spinal patterns.

Integrations—as, for example, those of the proprioceptive system (labyrinth, cerebellum)—do exist above the upper level of the spinal cord.

Building upon the embryological grouping of nerves and their end-organs, the muscles, we have gradually come to see an increasing complexity of neurone patterns or arrangements, a manifestation of evolution, of which the dorsoventral integration of progression by hip and shoulder movements (tetrapodal animals) forms one stage, and the folding and unfolding DVDV and VDVD integration made manifest in stepping and in decerebration forms another and later stage.

With a clearly-defined notion of this and the other simpler spinal integrations established, the study of supraspinal integrations of movement and posture and their significance becomes possible.

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AN EXAMINATION OF THE FREUDIAN THEORY OF SEX.

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THE rock on which all discussion on psycho-analysis seems to split is the insistence of the Freudians on their interpretation of the 'sexual impulse'. Unfortunately, it seems that when this subject is raised, the most discriminating and logical disputants tend to fall from their 'cortical' levels and become almost 'thalamic' in their reactions. All or none is the law that is followed; on the one side it is all, on the other it is none. Certainly some statements are fairly staggering. Thus Hug Helmuth¹ states that "skin and muscle eroticism must be regarded as the most primitive form of sexual feeling", and that "the infant who finds a source of pleasure in strong muscular activity always exhibits outward signs of emotion, such as increased brilliancy of the eyes, flushed cheeks, and so forth, that are well known to the adult as indications of sexual excitement". This implies that all these activities of infancy are actually sexual as understood in the adult sense; but not many would go so far as this. However, Freud² himself says, "I wish distinctly to maintain that the sexual impulse supplies the only constant and most important source of energy in the neuroses, so that the sexual life of these patients manifests itself either exclusively, preponderately, or partially in these symptoms. The symptoms are the sexual activities of the patient". Again, "It seems certain that the newborn child brings with it the germs of sexual feelings which continue to develop for some time and then succumb to a progressive suppression, which is in turn broken through by the proper advances of the sexual development and which can be checked by individual idiosyncrasies". "Psychic forces develop which later act as inhibitions on the sexual life, and narrow its direction like dams. These psychic forces are loathing, shame, and moral and æsthetic ideal demands. We may gain the impression that the erection of these dams in the civilized child is the work of education; but they are probably brought about at the cost of the infantile sexuality itself, the influx of which has not stopped even in this latency period—the energy of which, indeed, has been turned away either wholly or partially from sexual utilization and conducted to other aims."

Thus all the 'impulses' which are said to determine the behaviour of the child, and later of the adult, are said to be sexual, and, arguing in this way, they talk of skin eroticism, muscle eroticism, and mucous-membrane eroticism as the primary forms of sex activity. Then they recognize that certain areas of the body are established as special erogenous zones, such as the mouth, anus, genitalia, etc. These at first have equal selective activity for stimuli, and all lead to sexual activity, i.e., 'sexual' feeling and 'sexual' action. Thus Freud,³ speaking of sucking infants, says, "The gratification can only be attributed to the excitation of the mouth and lips: hence we call these parts of the body erogenous zones, and the pleasure derived from sucking, sexual". Later, under ordinary circumstances, the special zones with the exception of the genitalia lose their potency more or less, and so the normal erotic sensation is confined to the proper physiological system. Under special circumstances, however, the genitalia do not achieve complete predominance, but this is shared or usurped by one or more of the other erogenous zones, with the result that various perversions arise. However, it is not only on the receptive side that infantile sex is manifested, but also on the conative side, and the infant is described as having various wishes or sets towards muscular activity which are of a sexual nature. These take the form of sadism, masochism, exhibitionism, prying, as well as the apparently more obviously sexual activities of embracing, cuddling, etc.

If we examine these on a physiological basis, two questions occur to us. Are all these so-called impulses sexual at all, and can we usefully talk about impulses in this vague way without making any attempt to define what we mean by impulse, and how and from where the 'driving force' of these impulses comes, that we hear so much about? The primary forms of so-called eroticism are evidently primitive sensory experiences: that is to say, simple engrams* are activated by simple stimuli. For example, suppose an infant's skin is gently stroked, or the mucous membrane of his lips and gums are gently rubbed, a stimulus is applied which will activate certain sensory neurone paths. If the stimulus is not too violent, the activation will travel from the sensory neurones to certain autonomic neurones, with the result that glandular and smooth-muscle activities will result which are familiar to us as expressions of pleasure, excitation, and appetition, and with these the child will experience a feeling of pleasure, etc. At the same time striped-muscle activities are manifested

* By *engram* is meant a series of neurones which form a group within the nervous system through which the activation aroused by a given stimulus tends to spread, following a path through these neurones rather than through any others.

which at this age are poorly integrated and for the most part ineffectual, but which have the general tendency of bringing the child into a position to receive more of the pleasure stimulus. Freud admits that these manifestations may be described as 'organic pleasure', but insists that because similar activities are undoubtedly sexual in the adult they must be sexual in the child. He says, however,³ "I know too little about organic pleasure and its conditions, and will not be at all surprised if the retrogressive character of the analysis leads us back finally to a generalized factor". Directly the stimulus passes a certain intensity it becomes unpleasant, and totally different behaviour results. Such behaviour resulting from purely sensory stimuli is characteristic of infancy, for with one exception the engrams involved soon become more complicated and differently integrated as do the patterns* of behaviour observed. This complication of pattern will result in a relative diminution of autonomic activity, and consequently in a diminished intensity of feeling and an enhanced predominance of thought and integrated muscular activity. In consequence, this type of behaviour is not as a rule met with in the adult in response to ordinary sensory stimuli; but, as mentioned above, there is a notable exception to this statement. The sex pattern is relatively late in its manifestation, and in the physical sex act there is retained in adult life an example of the primary affective poorly differentiated 'sensory' experience which is common in infantile life. Hug Helmuth may be correct in stating that she observed in the kicking infant, who is enjoying kinæsthetic sensation, behaviour similar to that of the adult enjoying sexual sensation; but it is suggested that she is wrong in deducing from this that the kinæsthetic or tactile sensation of the infant is a sexual sensation; things which are examples of the same principle are not themselves identical. The special erogenous zones described by the Freudians are apparently those areas of the body in which the sensory end-organs are most abundant and most specialized, and they are not inherently sexual.

One argument on which the Freudians base their claim to the truth of their concepts is that it affords an excellent explanation of the development of the perversions and explains many symptoms of the neurosis, and that, even in the normal adult, stimulation of the 'erogenous zones' induces a more or less sexual experience. These contentions can, however, be adequately met by the concept of conditioning of patterns. It may well be that, as a result of

* The word *pattern* is used here to denote a physiological conception. While the engram is essentially an anatomical arrangement of neurones, the former term may be applied to a pattern of stimuli acting on the organism, or a pattern of reactions in the central nervous system, or a pattern of behaviour as observed by an investigator.

hereditary or environmental influences, one or more of these patterns associated with sensory stimuli may become associated closely with the sex pattern, and thus take on a definitely sexual association. This is normally the case with the stimulus to the mucous membrane of the mouth involved in kissing. This may go much further, the whole sex pattern being modified and altered so that an abnormal stimulus sets it off and a perversion results. Thus suppose some sensory pattern Y with stimulus X and activity Z is brought into association with the sex pattern B with normal stimulus A and activity C, the two may be so conditioned that instead of two processes taking place—



only one process takes place, thus —



and A no longer activates any pattern, and the activity Z is no longer produced by any stimulus. This, of course, represents the extreme degree of a perversion, as for example when ordinary sexual stimuli (A) have no effect whatever, while cruelty stimuli (X) actually produce orgasm (C), and do not in any degree produce the ordinary results (Z): but all intermediate processes occur, and are not uncommon.

With regard to the conative tendencies mentioned above, there seems no particular reason to describe them as essentially sexual. In fact to do so would be the result of arguing from the wrong end. No one will deny that sadism and masochism, exhibitionism, prying, and the like, as seen in adults, are associated with sex: but the reason for this is that the very nature of the sex act demands that the sex pattern shall incorporate certain of these patterns as part of its complex whole. The sexual act being painful on the first occasion, it is necessary that a certain degree of active cruelty and submission to cruelty should be exhibited, and in certain cases the normal sex pattern may be profoundly modified and even totally submerged by the sadistic or masochistic pattern if these are strongly developed, thus leading to perversions, but this is simply another example of conditioning. For example, the small boy who pulls the wings off flies is not doing anything sexual, but later on his sex pattern may be conditioned by this pattern, which results in cruel behaviour, so that he becomes a sexual sadist. At first sight exhibitionism and

prying seem to be more definitely sexual even in infancy, but it must be remembered that these types of behaviour are closely associated with curiosity, and that in consequence they will be concerned, not with the obvious, but with those things which custom keeps hidden. Young children will often exhibit or 'pry into' their sexual organs, but equally often will they concern themselves with micturition or defecation, and also with their nostrils and ears, which cannot be physiologically regarded as sexual acts: but they have this in common, that they are all usually hidden from observation.

To sum up this argument, it would appear that the Freudians who derive all sorts of manifestations from sexuality are making the same mistake as those earlier critics of Darwinism who pointed to the monkey in the Zoo as their friend's great-grandfather, oblivious of the fact that Darwin postulated a common ancestry to monkey and man: so it would appear that sexual experience is only one form of primary experience, and the sexual 'wish' is only one form of primary infantile tendencies to action.

The other criticism is no less important, namely, of the use of the word sexual impulse, libido, or what you will, as if it were some special force which drove on the individual to his doom. This loose use of the conception of forces is certainly responsible for the wanderings of many less erudite psychologists from the paths of probability. We have no right to postulate forces the evidence of whose existence can only be drawn from our own imaginations, and those who seek to defend themselves behind the skirts of M. Bergson's *élan vital*, which many seem to do, forget that though a concept may be valuable and justified in the realm of metaphysics, it can by no means be translated without modification into the realm of physiology. Not to put too fine a point on our criticisms, we may allow that so-called 'energy' becomes available as the result of chemical changes, and that when these chemical processes have achieved a certain relatedness we encounter the phenomenon of life, and our chemical changes become biochemical changes. It is time that the 'new psychologists' were reminded that they have got to explain their theories in terms of the influence of biochemical changes on afferent end-organs, neurone patterns, efferent end-organs, and muscular and glandular activities. Many psychologists will insist that this is cramping psychological enterprise, that if they are tied to physiology they can never advance at all. Unquestionably this is to a certain extent true, and the last few years have shown what enormous new fields have been opened by 'unbridled psychology': but many will agree that the time has come to call a halt and try to correlate all the work that has been done with known physiological principles, for thereby we may advance the more slowly-moving science and control the

high-speed speculation. To the simple mind of the ancient a polytheistic conception of the universe seemed to explain everything to perfection, but the squabbling of the Olympians reduced the old philosophers to despair. So the facile description of warring impulses each with its own driving force is proving a thicket of thorns, and we shall really get our ideas more clearly arranged if we try to explain behaviour in physiological terms and confine our attention to the principles of facilitation, inhibition, and conditioning, which have been firmly established by Pawlow, Sherrington, and others.

To return once more to sex, it is suggested that in infancy it is not an impulse but an engram, already laid down perhaps, whose synaptic 'passages' have not yet been so facilitated that there is a definite serial activation from the specific stimulus to the specific muscular and glandular activity. Alongside this engram are numerous other engrams, some of whose synaptic passages are already facilitated. As growth proceeds and environment influences the child, these engrams and their patterns of reaction become more complicated, more closely integrated together and conditioned in all sorts of ways, with resulting new facilitations and new inhibitions. Amongst these develops the sex pattern, becoming more and more involved with others, conditioning and influencing more and more of the total personality, till in adult life it plays the preponderating part that is universally admitted. So, many of the patterns, originally independent, become inextricably bound up with the sex pattern, and it becomes all too easy to argue that because they are sexual now they always were sexual, and that sex is at the foundation of everything.

But the criticism will be advanced. What of the disclosures of psycho-analysis, which has afforded undoubted evidence of sexuality in young children? These apparent evidences, however, require to be most carefully and strictly examined.

Almost everyone will admit that Freud was perfectly right in insisting that people in general were much too given to rationalization, and that they hid from themselves the real motives of their actions, and that this is specially true in respect of sex. Everyone who has had experience of the treatment of neurotics cannot but be convinced how frequently the symptoms are based on a conflict in the sexual life, and that this disharmony is not recognized by the patient. So much is this so that it needs the most constant self-criticism to prevent one expecting some sexual basis, and one is apt to have a definite feeling of gratification when one finds, or thinks one finds, the sexual theme for which one has been waiting. This affective experience is due to a variety of causes, and perhaps the most important is, that we ourselves are not free from the conditioning

of our sex and curiosity patterns which results from the wholesale repression of sex in our education: hence there is a personal gratification in discovering sexual facts about others. Experience or analysis may enable us to recognize and control this affective reaction, but none the less it is there. If, in addition to this, our reactions towards Freudian theories are of the 'all' variety, we shall be still more inclined to welcome and lay stress on sexual interpretations. But, it may be objected, the sexual memories and dreams, etc., are produced by the patient, and the physician does nothing. Firstly, this theory that the physician does nothing is very often a rationalization. Which of us in carrying out an analysis can honestly say that we do nothing, and in no way influence the patient's train of thought? Secondly, the patient himself is suffering from that conditioning of his sex and curiosity patterns, and enjoys that pleasurable affective experience when he can endow a memory or an experience with a sexual meaning. This pleasure is intensified by the fact that he is talking confidentially to a person who is not antagonistic to sexual phantasies as is the general public, but, on the other hand, welcomes them and encourages them. Thus, in attaching sexual meanings to memories of childhood and dreams of childhood we have to discount these important influences, the gratification induced by the activation of the conditioned sex and curiosity patterns both of the physician and of the patient.

Another objection may be raised here, that in some cases the patients who have been analyzed have been children from five years upwards, and that the results of analysis have still disclosed sexual experiences and phantasies. In such cases it cannot be the tinging of the 'memory picture' by subsequent sex-curiosity influences related to the present personality of the patient in the sense referred to above. That is so, but it is almost unbelievable that a child of five or even much older can produce a series of 'free' associations, without being influenced to a very considerable extent by the physician. Personally I have not had experience of analyzing, or attempting to analyze, very young children, but I have tried to do something with older children and high-grade mental deficient, and I must confess that there was a great deal of suggestion in the result. That does not mean that such may not be of therapeutic benefit; I believe that it certainly is.

One reason why memories and dreams of childhood were so easily accepted by the Freudians is that they seem to have gone back to the old idea that memories are stored in the mind like bottles in a cellar, and that to restore them one went down into the cellar and brought up the bottles—a little dusty perhaps, but still the same bottles. This concept was discarded by academic psychology years

ago, and there is no reason whatever why it should be revived. Memory is a very complex subject, and no adequate explanation is perhaps even now at our service: but reduced to its very simplest terms from the physiological standpoint we must realize that all that is retained is a conditional potentiality of restoration. If an engram is activated by a stimulus, then it will be modified as a result of that activation. If that modification is extreme, then the next time that the engram is activated the psychical and physical behaviour (thought, feeling, and muscular action) will be more or less identical: but the pattern of reaction is again modified as a result of this activation, and so gradually modifications occur, and before long the recalled 'memory' differs materially from the original experience. This is what usually happens, as may be shown by the comparison of a recalled memory of an event and a contemporary record. It may happen, perhaps as the result of endocrine activities which accompany the feeling of unpleasure, that the synaptic junctions of this engram are inhibited and the whole is 'repressed', so that no further activation of just that engram takes place until some special stimulus occurs in the course of the analysis: but, even so, it is difficult to imagine that any pattern of reaction can persist unmodified from childhood to adult life when we consider the enormously complex modifications, integrations, and disintegrations which are daily taking place, especially under the influence of the rapid development and intricate conditionings of the various patterns which make up the personality, which take place with the expansion and establishment of the sex pattern in all its ultimate ramifications.

From this it is clear that, apart from the influences mentioned above, it is unlikely that a memory recalled from childhood is a true representation of past experience: but as Jung pointed out, many of the so-called psychic traumata were nothing but phantasies projected back into the past, if one may use such an expression. The following case may illustrate my meaning. It is only an example out of many, but I chose it because it seems to be a peculiarly apt illustration.

A., age 29, homosexual, had an obsession for looking at the genitalia of other men. This dated back to the age of five. At first sight this seemed to be obviously a case of infantile sexuality. That the obsession and its gratification served as a sexual stimulus now was unquestionable, and there was no doubt that his whole neurosis was closely bound up with his sexual difficulties. However, I decided to try my best to avoid suggestion, and to discover whether this really was a sexual manifestation. He soon began to talk freely of his sexual troubles, and experienced considerable relief from the unburdening of his soul. He was asked to try to trace the origins

of his obsession. At first he thought it must be some early sexual manifestation: but there was no conviction about this, and no resistance against talking of it. He then remembered, at a very early age, seeing both his father and elder brother urinate, and being intensely curious. Next he discussed with some warmth his feelings of impotence and deficiency in bodily strength which he experienced in early childhood, and how his father was the special object of his jealousy in this respect. As a matter of fact, he showed clearly that he suffered from what is usually described as the *Oedipus complex*: that is to say, he was abnormally attached to his mother and disliked his father. Unquestionably this was now conditioned by sex, and indeed he had an incest dream of his mother which filled him with intense horror: but on carefully analyzing this it was evident that it depended on (*a*) curiosity pattern, (*b*) jealousy of father on account of muscular strength with an identification with the father, and (*c*) what was indubitably a sexual phantasy and not an original experience or wish.

It is difficult to describe the analysis of a case briefly in a paper: but I would suggest that in this case the neurosis was due in large measure to conflicts and repressions of a sexual nature operating since puberty: that into this net had been drawn conflicts operating before puberty, not in themselves sexual, the obsession with regard to the penis being as a urinating and not as a sexual organ, and depending on curiosity and will to (bodily muscular) power. I can imagine many Freudians, if they gave themselves the trouble of reading this paper, exclaiming, with disgust, that of course this case and others like it depend on infantile sexuality, but that the writer's own sexual repressions prevent his acknowledging it. To this, of course, there is no answer except that there seems to be a danger, when repressions are removed, that the patterns so freed come to dominate the mind too much. For myself I wish that the factors influencing the sex pattern before puberty were more clear, for then it might be possible to do something to relieve the homosexual from his numerous difficulties in facing life, a problem which hitherto seems to have baffled even the elect.

In conclusion, I would like to say that the above remarks are not directed against analytical treatment. I am convinced that a straightening out of the tangles in the patient's mind is always helpful. Further, an insight into the various patterns which go to make up his personality, and how these have been modified, inhibited, and conditioned, and perhaps drawn into the sexual pattern in the course of mental development, must be of use. However, unless we keep ourselves in touch with principles which can be experimentally demonstrated, concepts are apt to be formulated which are too

sweeping, and facts are apt to be distorted to fit into them. It is for this reason that I suggest that the Freudian theory of infantile sexuality requires careful examination on the part of psychologists, who should neither treat it as the Inspired Word nor dismiss it as a *mauvaise plaisanterie*.

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THE TREATMENT OF RESIDUAL EPIDEMIC ENCEPHALITIS.*

BY GEORGE H. HYSLOP, NEW YORK.

- I. INTRODUCTION.
- II. PATHOLOGY.
- III. PHYSIOLOGY.
- IV. SYMPTOMS.
 Interpretation of Symptoms.
- V. THE THERAPEUTIC PROBLEM.
 Explanation of Table I.
- VI. SUMMARIES AND OBSERVATIONS.
- VII. OBSERVATIONS ON TREATMENT.
- VIII. CONCLUSIONS.

I. —INTRODUCTION.

THE chronicity of the residual phenomena of epidemic encephalitis is a problem of therapeutic importance. The study here presented deals primarily with the treatment of Parkinsonian residua, which are exceedingly common. Grossman,¹ in the re-examination of 89 cases of epidemic encephalitis, found that 58 per cent showed tremors or irregular involuntary movements: 50 per cent examined a year or more after recovery from the acute stage of the disease had these symptoms. This author estimates that approximately 10 per cent of his cases were becoming progressively worse. In the experience of the Neurological Service of Bellevue Hospital and of the Cornell Dispensary, the great majority of patients complaining of the after-effects of encephalitis present a Parkinsonian picture, with a vast variety of concomitant symptoms. Many of the patients are unable to earn as much as they could before their illness. Some cannot work at all through actual physical impediment. Nearly all have personality changes which often are in proportion to the physical symptoms and suggest that, although the disease does at times impair mentality without any evident physical symptoms, such impairments are due to the patient's reaction to his disability. In any event, these patients justly demand that medicine do what it can to relieve them. Inasmuch as encephalitis and its residua are new to medicine, we cannot make an accurate prognosis in the Parkinsonian cases. It is possible that the pathology of the disease makes complete recovery unlikely in the majority of cases. If so, amelioration of the symptoms is the best that can be done.

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The search for effective therapeutic measures compels, as a first step, consideration of the pathology of the disease, the functions of the tissues affected, and the symptoms occurring in the Parkinsonian picture.

II.—PATHOLOGY.

In the acute stages of the disease there occur cellular infiltration about the smaller vessels, varying degrees of degeneration of nerve-cells and fibres, and proliferation of neuroglia-cells. These processes are of greatest intensity in the grey matter of the basal ganglia, mid-brain, and pons. The white matter is involved to a much less extent.

In the chronic stages there may be degenerative changes in the walls of the vessels, some perivascular infiltration (less in the more chronic cases), and pronounced neuroglia proliferation. I have not found reported any extensive observations as to changes in the various nuclei and their nerve-cells. There is scanty evidence of anything like a continued infection in most of these cases.

Inasmuch as in the acute stages the foci of greatest intensity are irregularly scattered, the chronic lesions will have a like distribution. In a given chronic case, for example, there may be lesions in the right basal ganglia, the hypothalamus, and the left posterior longitudinal bundle. These lesions will be where the foci of greatest intensity occurred in the acute stage. It is in this fashion that one can best account for the variety of concomitant symptoms present in a number of cases, all having two or three main symptoms in common.

Until we have studies of serial sections of the entire brain in cases of residual encephalitis, one may only guess at the true nature or extent of the pathological processes, and it will be impossible to understand accurately many of the symptoms, which are of great interest in that they throw light on the functions of the basal ganglia, diencephalon, mesencephalon, and pons.

III.—PHYSIOLOGY.

Various syndromes resulting from definite lesions of the basal ganglia, the diencephalon, and the mesencephalon are known. These structures have as their function the correlation of motor and sensory impulses to and from the cortex. Depending upon the site of a given lesion are the symptoms accompanying it. In addition to a correlative function, these parts of the brain have some influence in metabolism and in the function of the sympathetic nervous system. There are sympathetic cells in the mid-brain, and lesions of the mid-brain and hypothalamus often upset the vegetative nervous system. Leschke² points out that alterations in function of the diencephalon, especially of the hypothalamus, may lead to important changes in the vegetative

economy, showing themselves in the form of diabetes insipidus, diabetes mellitus, dystrophia adiposogenitalis, heat regulatory changes, disturbances of pupillary reaction, and abnormalities of sweating and vasomotor activity. He states that in all cases of dystrophia adiposogenitalis lesions are found in the diencephalon, yet are often absent in the pituitary body. This is evidence of the existence of a metabolic centre in the diencephalon. Bing³ regards the salivation and hyperidrosis of encephalitis as due to diencephalon lesions.

The corpora striata have predominantly a motor function. Lesions here produce tonus and posture disorders, and also in some cases tremors of a certain type. The subthalamic and tectal regions also have a motor function.

The thalamus has a sensory function, and some authorities maintain that its state determines the feeling of well-being.

IV.—SYMPTOMS.

The outstanding symptoms in the Parkinsonian cases are rigidity, tremors of various types, and impairment of associated movements. Concomitant symptoms, which vary in the different cases, are numerous. Novel varieties constantly occur: but certain relatively common ones are worth mention—salivation, hyperidrosis (limited to the face in two cases, to one side of the body in two other instances), exophthalmos (stimulus of the grey commissure of the thalamus produces secretion of tears, dilatation of the pupils, and exophthalmos),⁴ strongly positive oculocardiac reflex, disturbance of the respiratory rhythm, and increase in weight. Two cases of diabetes insipidus and one of transient diabetes mellitus were observed. We found no instance of altered function of the sexual organs. Apropos of the salivation, it is sometimes found in paralysis agitans, but in Parkinsonian encephalitis the salivation is intense and quite out of proportion to the other symptoms. The degree of salivation present is thus probably of diagnostic value in a case in which one cannot obtain a history of previous encephalitis.

Interpretation of Symptoms.—The symptoms may therefore be regarded as evidence of disturbance of the static system of motility⁵ and also the central ends of the vegetative nervous system.⁶ The basal ganglia and the diencephalon seem to be sites of the chief lesions. The nature of the morbid process is still a matter of question. It is still unknown whether the symptoms are due to persistence of the original infection, to a recrudescence, or are merely the result of a destruction of tissue during the acute stage of the disease. Bing holds that a definite pathology is established, and that the remaining syndrome is not due to the presence of the virus.

V. —THE THERAPEUTIC PROBLEM.

Thus, the therapeutic problem in residual encephalitis is one of ameliorating symptoms due to degeneration in, or possibly to active infection of, certain tissues, with attendant impairment of function. General hygiene to maintain the body at its best level of activity is a first requisite. Re-educative measures to offset some of the motor disorders are important. Finally, drugs to counteract symptoms should be sought.

The chief symptoms to be treated by drugs are of two forms — those due to a disturbed static system of motility, and those evidencing a disturbance in the central ends of the vegetative nervous system. Both autonomic and sympathetic divisions are affected in residual encephalitis, and the problem is rendered the more difficult because of the fact that in a given patient the symptoms do not characterize disturbance of either part alone. There is rather a confusion of symptoms, showing that there is an irregular involvement of both divisions. The fluctuations in symptoms often made it difficult to interpret the effects of drugs. Subjective changes and the influence of suggestion had to be considered. All patients but one of a group of fifteen encephalitics, the subjects of this study, were observed while they were on the ward. The period of observation averaged over a month for each case — for some patients as long as three months, and less than a month in only three instances.

Various drugs, including arsenic (both as Fowler solution and in the form of sodium cacodylate), strychnine, iron, urotropine, and the endocrine products were used in these and other post-encephalitics. Physiotherapy — massage, exercises, electrotherapy, and hydrotherapy — was given to nearly all cases. As other observers have learned, these methods of treatment seem to have no real curative effect.

In selecting drugs for experimentation, those having a definite action on the vegetative nervous system were chosen. Central depressants in particular seemed theoretically the most promising. The long-known value of hyosine, a central depressant, in paralysis agitans, and the points of resemblance between that disease and the Parkinsonian residua of encephalitis, suggested the use of that drug. Other observers have found it helpful in residual encephalitis. Atropine and belladonna, although acting as central stimulants, were used. Belladonna preparations all contain some hyosine, and therefore their action is difficult to interpret. Gelsemium and its active principle gelsenamine are central depressants, and therefore demanded investigation. The action of this drug is not well understood, and it has not been used in residual encephalitis. In addition to these drugs, adrenalin, nicotine, picrotoxin, pilocarpine, and morphine were used, but chiefly as controls and to a less extent. Cicutine hydrobromate

has been reported as of value. It has pharmacologically the same action as conine, which in turn is similar to gelsemium. For that reason, and also because an opportunity did not present itself, no observations on cicutine were made.

RESIDUAL ENCEPHALITIS CASES.

Cases	Sex	Age	Interval from recovery from acute stage to onset of residual symptoms	Period from acute stage to admission to hospital	Period of observation	Remarks as to residual symptoms prior to admission
1. D. O.	M	19	None	Admitted as acute case	4 months	Stationary
2. P. A.	M	18	None	12 months	3 months	Gradual progression with remissions
3. J. C.	M	30	2 months	5 months	2½ months	Stationary
4. E. E.	M	17	1 month	7 months	1½ months	Gradual progression
5. J. D.	M	24	1 month	12 months	1 month	Gradual progression
6. H. B.	M	32	3 months	18 months	5 weeks	Gradual progression
7. J. W.	M	56	None	16 months	2 months	Stationary 1 year, relapse and progression for 4 months
8. P. B.	F	28	None	14 months	7 weeks	Relapses at 3rd and 9th months, stationary from then on
9. M. S.	F	26	None	20 months	1 month	Stationary
10. E. B.	F	37	None	24 months	6 weeks	Stationary
11. M. L.	M	19	14 months	22 months	6 weeks	Gradual progression
12. J. K.	M	55	2 months	26 months	5 weeks	Stationary, remissions
13. S. F.	F	14	None	18 months	4 months	Relapse 4th month, gradual progression 14 months, with slight remissions
14. P. W.	M	30	None	16 months	3 weeks	Stationary
15. S. J.	M	18	14 months	18 months	1 week	Gradual progression

The major part of the observations were upon the effects of hyoscine and gelsemium. As subjects there were 15 patients with residual symptoms of encephalitis. One patient had choreiform movements; the others were all of Parkinsonian type. One patient was under observation from the time of onset of the disease. The appended

table gives the important details in each case. In addition to the post-encephalitis, 5 cases of trigeminal neuralgia were studied for the effects of gelsemium, and 3 paralysis agitans cases were studied for the effects of both gelsemium and hyosine.

Explanation of Table I.—Of the 15 patients, 4 were female, 11 male. This proportion has held true in our experience of about forty cases of residual encephalitis. In all but two patients the residual symptoms were present from the time of the acute stages of the disease or within a short period after seeming recovery. In 2 instances there was an interval of normal health of fourteen months before new symptoms appeared. In both of these patients the Parkinsonian state developed gradually. Three of the fifteen patients had relapses: one patient (*Case 7*) had a relapse taking the form of bulbar palsy and seemingly had a recrudescence of the infection. In the other two instances (*Cases 8 and 13*) the relapse followed a miscarriage and a fall. In *Case 3*, after two months of nearly normal health, a fright occurred and Parkinsonian symptoms appeared at once. Emotional shock and strain are known frequently to be followed or accompanied by increase of symptoms in various organic diseases of the central nervous system. One may cite brain tumour, multiple sclerosis, cerebral forms of syphilis, paralysis agitans, and cerebral arteriosclerosis. Possibly emotional states produce cerebral circulatory alterations which, in the presence of disease, may further cripple functions already impaired.

VI.—SUMMARIES AND OBSERVATIONS.

Brief case summaries will be given first: observations of particular interest will follow; and finally the salient features of the various cases will be tabulated.

Case 1.—D. O., male, age 19.

History.—Onset February, 1921. Parkinsonian type: recovery by April 15. Residua stationary and consisting of slight physical symptoms and marked hypochondriasis. Discharged May 13.

Treatment.—Treatment of residua by hyosine and gelsemium. No effects. After discharge took gelsemium for four months. No effects.

Case 2.—P. A., male, age 18.

History.—Onset January, 1920. Partial recovery by February. Lethargy, weakness, and diplopia until July, when tremor, anteropulsion, and monotonous speech appeared. Gradual progression until admission, January, 1921. Discharged improved in February. Did well about one month, then got gradually worse again. Re-admitted April, discharged June 8.

Treatment.—During first admission improved under arsenic and physiotherapy. During second admission there were several fluctuations

in symptoms, which seemed to be independent of medication. The greatest and most rapid improvement was when hyoscine was being given. Results are quite doubtful therefore.

Case 3.—J. C., male, age 30.

History.—Onset December, 1920; recovery in a month. Fright in February, followed at once by tremor, stiff gait, monotonous voice, and stammering. Admitted May 3, discharged July 26, 1921.

Treatment.—Improved about 50 per cent, with occasional brief periods of slight relapse. Opium, given for four days, was accompanied by the most marked improvement. While taking gelsmium improvement was steady.

Case 4.—E. E., male, age 17.

History.—Onset November, 1920; recovery for one month. Gradually progressive Parkinsonian symptoms, commencing in January. Admitted July 1, 1921, marked Parkinsonian picture. Discharged Aug. 12.

Treatment.—Gelsmium only. There were slight fluctuations in condition, but in general a tendency toward progression. Drug not effective.

Case 5.—J. D., male, age 24.

History.—Onset June, 1920. One month later right-sided rigidity and tremor. August and September, diabetes mellitus. Parkinsonian features gradually progressed. Admitted July 19, discharged Aug. 22, 1921.

Treatment.—Gelsmium only. Steady and rapid improvement, practically well on discharge. Drug effective.

Case 6.—H. B., male, age 32.

History.—Onset January, 1920; recovery in two weeks. April, tremor left side of face, slowness in movement. Gradual increase of Parkinsonian features. Admitted July 29, discharged Sept. 15, 1921.

Treatment.—Improved steadily on gelsmium, got worse during ten days with arsenic, improved again as soon as gelsminine hydrochlorate was given. Discharged with at least 50 per cent improvement.

Case 7.—J. W., male, age 56.

History.—Onset January, 1920, followed by somnolence, rigidity left side, and slowness in all movements. January, 1921, had sore throat, dim vision, salivation, dysarthria, and dysphagia. Progressively worse. Admitted April 5, 1921, discharged June 10, 1921.

Treatment.—Made steady improvement on hyoscine and gelsmium. Relapsed on arsenic; improved again while opium was given; worse under pituitary and adrenal extract. Hyoscine and gelsmium each partly effective.

Case 8.—P. B., female, age 28.

History.—Onset March, 1920, improved until July. Had a miscarriage then, rapidly grew worse with Parkinsonian symptoms, with a severe relapse in January, 1921. Admitted May 20, discharged July 11, 1921. This patient was bedridden and absolutely helpless.

Treatment.—Steady and marked improvement under hyoscine and gelsmium, and under morphine. Made distinctly worse by atropine. In the last two weeks the patient received only urotropine and grew steadily worse.

Case 9.—M. S., female, age 26.

History.—Onset March, 1920, followed by slight degree of Parkinsonian symptoms and marked diplopia. Patient very hypochondriacal. Admitted Nov. 7, discharged Dec. 2, 1921.

Treatment.—Rigidity slightly decreased by both gelsmium and hyoscine. Adrenalin followed by brief increase in rigidity, nicotine by brief decrease. Other symptoms unchanged.

Case 10.—E. B., female, age 37.

History.—Onset October, 1919, followed by moderate degree of Parkinsonism, possibly a little worse the last six months. Admitted Oct. 16, discharged Nov. 28, 1921.

Treatment.—Improvement with hyoscine, gelsmium, and gelsminine hydrochlorate. All about equally effective. No improvement with opium. Adrenalin and nicotine had same effects as in *Case 9*.

Case 11.—M. L., male, age 19.

History.—Onset December 1919, with complete recovery in three weeks. Perfectly well until February, 1921. From then on, gradually progressive right-sided Parkinsonism. Admitted Oct. 10, discharged Nov. 28, 1921.

Treatment.—Steady improvement under gelsmium, gelsminine hydrochlorate, and hyoscine, worse when none of these drugs were given. Adrenalin effects as in *Cases 9* and *10*.

Case 12.—J. K., male, age 55.

History.—Onset December, 1918, recovery in one month. In February, 1919, choreiform movement of the left leg, face, and shoulder appeared. This lasted three or four weeks; since then there have been regular recurrences every six to eight weeks, not related to anything that the patient knows about. Admitted April 13, discharged May 11, 1921.

Treatment.—Improvement under gelsmium and hyoscine definite. Reported back to the hospital for three months after his discharge, and stated that as soon as he took gelsmium the movements decreased. Other drugs had no effect.

Case 13.—S. F., female, age 14.

History.—Onset January, 1920. Immediate left-sided Parkinsonian residua, but gradual improvement until August; then fell while skating and at once symptoms increased. After graduating from school in January, 1921, became steadily worse, the rigidity and tremor now being on the right side as well as the left. Admitted Nov. 18, 1921, discharged March, 1922.

Treatment.—Every time hyoscine, gelsmium, or gelsminine hydrochlorate was given there was distinct improvement. Atropine made her worse. Belladonna had no effect. Adrenalin increased rigidity. Picrotoxin, nicotine, and pilocarpine had no effects except for perhaps an hour or two after a dose was given; of these, nicotine decreased rigidity, the others increased it. The patient had four quite definite slumps in her condition, seemingly independent of what medication was being given. About 20 per cent improvement on discharge.

Case 14.—P. W., male, age 30.

History.—Onset February, 1920, followed by fatigability, tremor, sweating, and slight left-sided Parkinsonism. Stationary. Admitted June 19, discharged July 9, 1921.

Treatment.—One week of gelsemium alone made definite objective betterment: addition of glandular substances and strychnine did not alter the rate of improvement. Results here are perhaps open to some question on the score of complex medication. However, the gelsemium started the improvement.

Case 15.—S. J., male, age 18.

History.—Onset March, 1920. Perfectly well until June, 1921. Sudden appearance of breathing irregularity, with paroxysms of deep and rapid breathing, accompanied by moderate degree of Parkinsonism. Gradual progression until admission Oct. 18, 1921. Discharged Oct. 24, 1921.

Treatment.—Parkinsonian symptoms immediately improved (some disappearing) under gelsemium. No change in respiratory phenomena.

In addition to the above 15 patients with residual encephalitis, gelsemium and gelseminine hydrochlorate were given to 3 paralysis-agitans and 5 trigeminal-neuralgia patients. Two of the paralysis-agitans patients were helped slightly by these drugs: one, an early case, was improved considerably. Four of the neuralgia patients were helped—one patient remarkably so—in that these drugs gave relief where morphine failed.

In the case summaries, it will be noticed that little mention has been made of the other drugs used, or of the physiotherapy given the patients. That is because of the fact that where favourable results were obtained they seemed to accompany the administration of the drugs hyoscine, gelsemium, or gelseminine hydrochlorate. Again, in residual cases not reported in this paper, where these drugs were not used, little or no relief was obtained. Moreover, space for detailed description of treatment and results would obscure the positive findings in the mass of negative findings.

VII.—OBSERVATIONS ON TREATMENT.

1. Adrenalin 1-1000, in doses of 20 min. subcutaneously, increased the pulse-rate 50 per cent and definitely exaggerated the rigidity of the extremities for a period of two hours in three cases. Similar doses to non-encephalitic control cases had no such marked effects.

2. Nicotine sulphate, $\frac{1}{16}$ gr. subcutaneously, decreased the rigidity for a few minutes in three cases.

3. Picrotoxin, $\frac{1}{16}$ gr. orally three times a day, had no effect in one case. Given subcutaneously to the same patient, there seemed to be a temporary increase in rigidity.

4. Pilocarpine, $\frac{1}{12}$ gr. orally three times a day, had no effect on the one patient to whom it was given.

5. Atropin, $\frac{1}{100}$ gr. five times a day, made the patients worse in two instances (the same effects were noted in one other case not included in this report). Belladonna, as the tincture, in doses varying from 20 to 30 min. given three times a day, had no action, or produced effects similar to those of atropine.

6. Morphine given as opium pills, 1 gr. twice a day, caused improvement during administration in three cases and produced no results in one case.

Of these drugs, those stimulating the central ends of the vegetative nervous system were followed by increase of Parkinsonian symptoms. Action on the peripheral ends of the autonomic seemed to be of slight importance. Morphine, as a central depressant, gave relief: but it is a drug that one could not well give continuously to a sufferer from residual encephalitis.

We now come to the effects of hyosine, gelsemium, and gelseminine hydrochlorate. Hyosine was used in doses of $\frac{1}{100}$ gr. three times a day (usually orally). The dose of gelsemium, in the form of fluid extract, was 7 min. three times a day, although in some instances smaller doses were given. Gelseminine hydrochlorate was given in $\frac{1}{30}$ -gr. doses three times a day, sometimes by mouth and sometimes subcutaneously: either mode of administration seemed to be equally effective.

Hyosine was given to eight patients. Six (*Cases* 8, 9, 10, 11, 12, and 13) were definitely helped. Two (*Cases* 1 and 2) were not affected.

Gelsemium or gelseminine hydrochlorate, or both, were given to fifteen patients. Ten were helped (*Cases* 3, 5, 6, 7, 10, 11, 12, 13, 14, 15): of these cases, 5, 6, 11, and 14 responded most noticeably. Two patients (*Cases* 8 and 9) should be classed as doubtful because of the slight and temporary improvement. Three patients were not helped at all (*Cases* 1, 2, and 4). With these drugs, cumulative symptoms, which consisted of heaviness of the eyelids, dim vision or diplopia, dizziness, and at times a feeling of languor or confusion, appeared in about one-third of the patients. When these symptoms appeared, reduction of the dose to 4 or 5 min. thrice daily permitted continuous administration of the drugs. Cumulative effects disappeared within twenty-four hours after withdrawal of the drug, and were alarming in only one instance. That patient was one to whom gelsemium had been given for six days. She then received $\frac{1}{100}$ gr. of hyosine subcutaneously. Within five minutes of the injection she developed all the symptoms of hyosine poisoning, and for four hours was absolutely free of Parkinsonian symptoms. This patient had had hyosine in the same dosage previously without any such effects. So the situation was repeated. The same symptoms recurred. These observations suggest a synergism between hyosine and gelsemium.

VIII.—CONCLUSIONS.

1. The Parkinsonian symptoms suggest overaction of the central ends of the vegetative nervous system.

2. Drugs depressing the central ends of the vegetative nervous system ameliorate, those stimulating increase, Parkinsonian symptoms.

3. Hyoscine produced objective improvement in 75 per cent of Parkinsonian cases. It reduced tremor and rigidity, restored mobility of facies, and enabled patients to walk and use the arms more freely.

4. Gelsemium and gelseminine hydrochlorate were effective in the same manner as hyoscine in 66 per cent and gave marked relief in 25 per cent of Parkinsonian cases.

5. Hyoscine gives more relief than gelsemium or gelseminine hydrochlorate in most instances where the three drugs are given; but since the latter two drugs have no dangerous side actions, they are preferable to hyoscine for prolonged administration.

6. Two patients seemed to be cured by gelsemium. The degree of relief cannot be predicted from the duration of symptoms prior to treatment, but is inversely proportionate to the severity of the symptoms. The duration of relief corresponds to the period of administration of treatment.

7. In continuing observations on dispensary patients it was occasionally found that while either one of the two drugs (hyoscine or gelsemium) would be of help, the other would be of no avail or might even increase the symptoms. This seldom occurred, and, since continuous and frequent observation of the patients was impossible, no explanation is offered for the seeming contrary action of the drugs.

8. While either hyoscine or gelsemium seems to be indicated in the treatment of Parkinsonian residua of encephalitis, and while these drugs usually proved beneficial as judged by objective improvement during their administration, it must be admitted that the therapeutic problem is not simple. These same drugs at times fail to help. Other drugs have been reported as giving striking relief in certain patients.

One of the most striking therapeutic results was observed by Dr. Kennedy⁷ in his private practice: "A woman of middle age who had been unable to articulate, chew, or move the arms or legs on volition—so intense was the Parkinsonian spasm—after a suppository of belladonna was able to talk fluently, move quickly and with grace, and express emotion easily by gesture and facial expression. Congealment of function gradually returned, but temporary dramatic amelioration has always been possible by the rectal use of belladonna in tolerance dosage".

More complete knowledge of the pathology, and of the function of parts affected by the disease, is necessary before we can predict what drugs should prove beneficial in a given instance.

I wish to express my appreciation to Dr. Foster Kennedy, in whose service at Bellevue Hospital these patients were observed, for criticisms and suggestions during the course of this work.

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Short Notes and Clinical Cases.

THREE CASES OF MANGANESE POISONING.

By J. R. CHARLES, BRISTOL.

PHYSIOLOGICALLY manganese occurs in small amounts in the human body, traces of it having been found in milk, bone, and hair, and from 0.5 to 2.5 mgrm. of MnO per litre in the blood.¹

Reiman and Minot² found that ores containing oxides and silicates were soluble in the gastric juice, and might be absorbed into the blood, causing a slight temporary rise in manganese concentration, which, however, was followed by a speedy return to normal. In no case was the manganese content of the blood increased by the ingestion of manganese to more than the normal level, and in some cases no increase at all was noted.

Large amounts of manganese ores given to dogs over a prolonged period failed to produce any definite changes in the manganese content of the blood or tissues, or to produce any pathological effects.

Manganese ores, therefore, appear to be non-toxic as a rule, and, in order to produce symptoms of poisoning, must be ingested by persons who have a personal idiosyncrasy: this may account for the rarity of pathological signs and symptoms which can be attributed to this cause in clinical practice.

There is, however, a definite grouping of symptoms attributed to manganese intoxication. Emotional disturbances may be manifest, with uncontrollable laughter, or weeping, more particularly at the beginning of the illness.

Sometimes mental languor and lack of energy are prominent symptoms at the onset. This feeling of fatigue is probably due to excessive exertion produced by the hypertonic condition of antagonistic muscles, involving excessive muscular work.

Later on the face wears a mask-like expression. Quite early in the disease there is a tendency to retropulsion, or in some cases to propulsion. The gait then becomes spastic, with a peculiar tendency for the patient to step forward on the metatarsophalangeal joints, a feature so marked in one of the cases described below that the patient had, of his own accord, the heels of his boots raised for ease in walking some time before he was examined.

The voice becomes monotonous, and increased salivation has been noted. There may be general paresis of the muscles of the limbs, but without atrophy or reaction of degeneration.

Tremors of the head and limbs are common, and are increased on intentional movement, and after exertion. These tremors vary from a fine twitching of the hands to gross rhythmical movements of the limbs, trunk, or head. The deep reflexes are increased. Paresthesias and pains occur in the limbs. There may be complaints of cramps in the calf muscles, generally worse after exertion. Edema of the legs is said to occur. Romberg's sign is not constant. There are no disturbances of deep or superficial sensation, no eye changes, no sphincter trouble, and no changes in the blood or urine. There are said to be no alterations in the cerebrospinal fluid, but in each of the following cases an excess of globulin was found.

Manganese produces no life-shortening degenerations. Slight cases in the early stages may recover from their symptoms, but advanced cases become life-long cripples, some non-vital part of the nervous system being irrevocably destroyed.

Manganese is used commercially in making chlorine gas, and in the manufacture of paints, varnish, enamel, and linoleum. It is also used in marbling soap and in making steel. Cases of manganese poisoning have been found among French workers who make bleaching powder, among Germans who grind manganese dioxide, and in Americans who work in a dust containing the oxide and silicate. Some fifteen cases have been described in Europe. Probably, however, the disease is not infrequently unrecognized.

The three cases described below had all been in hospital previously.

Case 1. J. B., was under my care a year ago, when his condition was regarded as one of functional aphonia, which was confirmed by the throat specialist, and functional paresis of legs.

Case 2. F. J., was also under my care, in May, 1919. His case was diagnosed as one of syphilitic myelitis. At that time he had a positive Wassermann reaction in his blood, spastic paresis of his legs, increased knee-jerks, and an extensor plantar response on the right side. He was given antisyphilitic treatment, including six injections of novarsenobillon, and was discharged with a much-improved gait, though his blood still gave a strongly positive Wassermann reaction. On readmission both blood and cerebrospinal fluid gave negative Wassermann reactions. He showed, however, throughout, signs of degeneration of the pyramidal, as well as the extrapyramidal, motor systems.

Case 3. S. W., had been in another hospital, under another physician, and was diagnosed as functional.

The three cases were sent to me again early in February, 1922.

by Dr. Coode, of Stroud, who pointed out that all three had been working in the same factory in manganese dust. The shortest time since any of them had been working in manganese was two years, and no manganese was found in the urine of any of them; nor was any found in their skin. They were given injections of pilocarpine, and their sweat was examined spectroscopically with negative results. The clinical picture of their signs and symptoms corresponded so closely with the recognized symptoms of recorded cases of manganese poisoning, as to leave no doubt with regard to the diagnosis in these patients. Their trouble probably represented irrevocable damage done to the nervous system, rather than any active and progressive lesion.

The following is a description of the cases:—

Case 1.—J. B. was admitted to the Bristol Royal Infirmary in October, 1921. He complained of inability to walk, except on his toes, and loss of voice.

Previous History.—Has had childish affections, but nothing else. Passed out of the army quite strong and healthy. (Class B2, owing to loss of thumb in circular saw at the age of 19.) Went into manganese works at Stroud when he came out of the army. He worked at the electric elevator, into which he shovelled the mineral manganese from Japan, China, or Russia. The elevators take the manganese up to sieves, and the dust in the elevator department he described as terrible. He has never had anything to do with paint or lead. No history of rheumatism, gout, cancer, syphilis. Blood tests stated to be negative.

Present Illness.—He went to the manganese works quite fit and well. He gradually got weaker while there, till he could not swing a sledge, and could hardly walk; at the same time he gradually lost his voice. Two or three days after he left the works he found he had to walk on his toes uphill. He shuffled along fairly well on the level, ran uphill on his toes, and when going downhill he got faster and faster until he ran into everything or fell over. He had to go upstairs on his hands and knees. In the beginning he had a tendency to fall backwards, but now he cannot walk backwards. He left the manganese works two years ago, after being there seven months, and went to an iron foundry. Since that time he has got no worse, but his voice has got a little better, if anything.

On Admission.—Pulse 70, regular, artery slightly thickened. No enlargement or abnormality of heart. Lungs, abdominal organs, and urine all normal.

Central Nervous System.—He can only whisper, and speaks in a monotonous way, but articulation good in spite of weakness of voice. Immobility of face muscles, cannot whistle, defective response to emotional stimuli. Other cranial nerves normal, except for tremor of his tongue.

Motor System.—Power in arms and legs not very strong either in flexion or extension. No spasticity in arms, but definite spasticity in all the leg muscles. Co-ordination good, gait dragging, spastic in type, walks on a wide base, and treads on his metatarsophalangeal joints, instead of on the soles of his feet. He has a marked tendency to fall backwards, and, when he does so, falls like a rigid pillar, due apparently to spasticity of trunk

and leg muscles. He walks with his arms rigid, and an absence of the normal automatic swing of arms.

Reflexes.—Knee-jerks present, equal on both sides, brisk: Achilles-jerks present on both sides: plantar reflex flexor, no ankle-clonus: no knee-clonus: wrist-, biceps-, and triceps-jerks all present on both sides.

Sweats a good deal at night, mostly from his back.

Nov. 4, 1921.—Pathological report of cerebrospinal fluid: Globulin increased: cell count 10 per c.mm: colloidal gold one degree of change in tubes 1 and 2, not characteristic: Wassermann negative.

Nov. 11, 1921.—Report on voice affection: Nasopharynx normal: nose septum irregular, some deflection to right, but fair airway: larynx normal, except slight weakness of apposition in anterior portion of glottis: tremors of cords: no redness of cords or any signs of laryngitis.

Dec. 5, 1921.—Patient has much improved as regards walking. His voice is not much improved: it is variable in strength from day to day. Blood-pressure, 118.

Case 2.—F. J. Complained of paralysis of legs, Nov., 1921.

Previous History.—Nothing of importance in family history. He had influenza three or four years ago. Twenty-three years ago he was in hospital with 'diseased hip', and was cured. Patient was employed shovelling manganese into machine sieve for three years. He left off three years ago, and has done nothing since.

Present Illness.—Three years ago (May, 1919) patient noticed that he stumbled when walking: he lost power gradually, till at length, a year later, he could stand only with difficulty. He suffered from acute cramp-like pain down the front of both legs and the backs of his thighs. He has remained in this condition ever since, but recently has noticed weakness of his arms.

He lies still in bed. His face lacks expression, and is very definitely mask-like in character. He speaks slowly and quietly, in low monotone. He cannot move his face muscles well. No response to emotion. Tongue shows slight tremor.

Motor System.—All the muscles of the right arm are fairly strong, with the exception of flexion of the wrist, which is definitely weak. The muscles of the left arm are all somewhat weaker than those of the right. The power in all the muscles of both legs is impaired. No spasticity in arms, but this is marked in his legs. Gait spastic, with feet wide apart, and putting toes down first. His heels barely touch the ground. He cannot turn round without holding on to some support. His arms are rigid and fixed to his sides when walking, without any swinging movement. Tremor in the muscles after exertion was not a marked feature in this case. Romberg's sign negative.

He sometimes gets aching pains in his knee.

Reflexes.—Arm-jerks normal: both knee-jerks exaggerated: patellar clonus on left side: plantar reflex extensor on right, flexor on left: ankle-clonus on left.

Nothing abnormal found in heart, lungs, abdominal organs, or urine.

Cerebrospinal Fluid.—Globulin increased: cell count no increase: colloidal gold slight change in tubes 1 and 2, nothing characteristic: Wassermann negative. (Blood Wassermann reaction also negative.)

Case 3. S. W. Admitted Oct. 10, 1921. Complained of inability to work.

Previous History.—Has not had measles, chicken-pox, scarlet fever, or rheumatism. Very moderate with alcohol and tobacco. No venereal disease. Previous health had always been good; worked as a walking-stick maker. Family history showed nothing of importance.

Present Illness.—In January, 1915 (nearly seven years ago), patient got a job in a factory where manganese ore was handled. His work was to grind the ore and throw the dust when ground into an electric shoot. He took due precautions about washing his hands before meals, etc., whether at the factory or at home. He did not find that the dust irritated his throat, but he noticed soon after he commenced to work that his voice began to get indistinct. After about six months he found he was liable to have rheumatic pains along the course of the bones of the thigh and legs, which were made worse in damp weather. He noticed, too, that he was liable to fits of depression and suffered from a dull heavy headache at the vertex. When he had been at work nine months in the factory he noticed a tendency to stagger backwards when throwing the ore on to a heap. At the same time there was a change in his gait: he scuffled because he could not lift his feet properly clear off the ground. He could walk uphill fairly easily with the aid of a stick, but on coming downhill he had a tendency to fall, as one leg particularly failed to support him. The patient had high heels fitted to his boots in order to make walking easier, as he could not lift his toes off the ground properly. The legs trembled, especially after exertion. He also had trouble with micturition: hesitancy about the act, but no pain. After a rest the patient returned to a different part of the factory, but had to give up after six months. Since that time he has not been at work (nearly five years). Since May, 1916, patient has been at home, completely crippled. He usually gets up in the morning, and sometimes walks a few yards with the aid of a stick.

On Admission.—Sits up in bed. He has a remarkably sallow face, at first glance suggestive of pernicious anamia. Expression varies very little, with a typical Parkinsonian mask. Speaks in a monotone.

Central Nervous System.—Articulation: expressionless, monotonous voice of low tone. Pupils react to light and accommodation sluggishly. He has a fine tremor in the tongue on protrusion.

Motor System.—No loss of power in arms. All movements extremely weak in both legs. This weakness appears to be largely due to spasticity of his muscles. He walks with the greatest difficulty, and only with support. Exertion of the leg muscles is followed by coarse tremor. He puts his feet forward on his metatarsophalangeal joints, and walks on a broad base, with knees bent, and has to be supported each side. He has a great tendency to fall, especially backwards, and when he does so, falls in a rigid pillar, due apparently to spasticity of trunk and leg muscles. He has great difficulty in turning. His writing is very tremulous. No hypertrophy or atrophy. He complains of cramp-like pains in his knees, especially at night.

Reflexes.—Arm-jerks normal. Knee-jerks exaggerated on both sides. Ankle-clonus on both sides. Plantar reflex flexor in type on each side.

No sign of disease in heart, arteries, lungs, abdomen, or urine. No manganese found in urine.

Cerebrospinal Fluid.—Clear; globulin increased; cell count 10 per c.mm.; colloidal gold reaction shows slight change, one degree in tubes 1, 2, and 3, not characteristic.

Blood-films.—No poikilocytosis: no anisocytosis: no basophil stippling: no normoblasts: no leucocytosis: Hb 75 per cent.

Dec. 12, 1921.—His gait has much improved on education. Still has difficulty in turning round: has a good deal of difficulty in starting to walk, but once in motion can walk better than he could, with the aid of a stick, or behind a wheel-chair.

In all these cases memory and intelligence were unimpaired, and no abnormalities were found in the special senses, fundi, or any of the cranial nerves, apart from those mentioned. There was no muscular atrophy. No objective sensory changes were found with regard to touch, pain, temperature, stereognosis, or sense of position. The sphincters were uninvolved.

It is very unfortunate that virtually nothing is known about the pathology of the disease. Casamajor had an autopsy in 1916, in which the following was found.

“Patient died from pneumonia.

“*Kidneys.*—Moderate chronic interstitial nephritis.

“*Liver.*—Considerable biliary cirrhosis, and the liver-cells contained much pigment, the majority of the granules being iron-containing.

“*Brain.*—There was some degeneration of more or less regular character in the longitudinal fibres of the pons which run with those of the pyramidal tracts. While these degenerations are regular enough to be assembled into clearly defined tracts, nevertheless it was impossible to determine either the upper or lower level of the tracts in question. The degenerated portion does not appear to go above the upper level of the pons, nor does the lower portion extend to any appreciable extent into the medulla. The pyramidal-tract elements are clearly defined, and those of the frontopontine and temporopontine tracts are fairly so.”

He was unable to reproduce this condition in animals (rabbits and dogs). From analogy, however, one cannot refrain from surmising that the disease may prove to be one involving the basal ganglia, i.e., the lenticular nucleus, or its connections, and possibly also the optic thalamus, since subjective sensations such as pains and cramps are prominent features in some cases. The striothalamic fibres may be involved. These run to the outer part of the thalamus, which is the part more definitely connected with the sensory system. One wonders if the cerebello-rubro thalamic system may also share in the trouble. From the nature of the symptoms it appears certain that manganese has a definite selective affinity for some definite nervous structures, that these structures are mainly motor in function, and that they are extrapyramidal.

Many of the clinical features of this complaint are similar to those described by Kinnier Wilson³ in ‘progressive lenticular degeneration’, though there are also many differences. The prognosis, too, is

different, for the latter disease is invariably progressive and fatal. Kinnier Wilson, in his monograph on progressive lenticular degeneration, points out that he does not consider this disease to be produced by congenital causes, by microbial agency, or by syphilis. Perhaps it may be shown that some metallic poison similar to manganese is the etiological factor, some poison to which most people are insusceptible (as in the case of manganese), but to which there may be a family susceptibility, and this may account for the familial incidence of his cases.

Lastly, the possibility of manganese as an etiological factor should be borne in mind, and excluded, before making a diagnosis of functional disease or of disseminated sclerosis.

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FOLIE À DEUX: DUAL ORGAN INFERIORITY, RELIGIOUS CONVERSION, AND EVANGELISM: CONFLICT, PSYCHOSIS, AND ADJUSTMENT.*

BY ROBERT D. GILLESPIE, GLASGOW.

INSTANCES of 'folie à deux' are not very common: but there are other psychopathological reasons for recording the following two cases. They are brothers, who both suffered from physical defects: they had the same family environment, of course, and enjoyed it together until they grew to manhood: they both developed a manic-depressive psychosis about the same time: they both made an adjustment recognizably abnormal: and they both looked upon their psychosis as a religious experience, and regarded themselves as converted thereafter. But in the one case the psychosis was essentially of the manic type, in the other it was depressive: in the one the psychosis has recurred, in the other there has been no marked recurrence; and their respective adjustments are markedly in contrast, the differences in their adjustments closely paralleling the differences in their types of psychosis. Moreover, they have remained closely associated all their lives: and if we divide their existences into two periods, the one ending with the onset of the psychosis in each, the other beginning with their recovery, we find an obvious change in their relationships to each other: so much so that he who was formerly the leader in their enterprises is now content to follow the other.

If we examine the mechanisms in their psychoses, we find them complementary, the one mental history representing chiefly the positive, the other the negative, aspect of the same process: or if we adopt the terminology of Adler, we may say that they represent respectively the 'maseuline', or aggressive, and the 'feminine', or submissive, sides of mental make-up. It is in fact as an illustration of the usefulness of Adler's conception of the 'neurotic constitution' that these cases seem principally of value. Nature has in them performed a psychological experiment *in vivo*, and we find the elements which Adler has had the skill to discriminate in all of us, separated from each other, and exhibited, not in phases of the same personality, but in two different personalities; while the experiment

* From the Glasgow Royal Mental Hospital, Gartnavel.

is controlled by having the environment, as far as possible, the same in each. In each of them, also, the significance of the father for the psychosis and for the adjustment is well seen.

The elder brother A. was born in 1868, B. in 1876. Their father was a man of strong religious prejudices and brought up his sons in the strict tenets of his faith. His father, in turn, had been a ring-leader in certain disturbances of religious origin in the early part of the century. Their mother became demented at the age of 68. Otherwise there was no known nervous or mental illness in the family. B. suffered from infantile paralysis, and his right arm remained parietic. A. had pleurisy at the age of 16. Both were delicate boys; but there were no other outstanding illnesses. A. was, as a rule, cheerful and good-natured, but easily depressed; soft-hearted and generous. He was musical, clever at his work, and tended to be over-energetic. He was an active member of societies, but always in the subordinate, less honoured, position of secretary or treasurer. Of B. less is known, but he was quiet and studious, and, like his brother, became a clerk. Although the younger, he was accustomed to be the leader in their joint enterprises.

Under the father's influence they became interested in Church work, and all seemed well for a time. But in 1904, at the age of 28, B., who was by this time a small, slightly-built, delicate man, became more and more absorbed in his religious activities, being specially interested in the reform of drunkards. He began to lose his power of concentration and his sleep, became very depressed, agitated, and impulsive, and was admitted to the Royal Mental Hospital, Gartnavel, on June 13, 1904, after a month's illness. There he refused food, was mute and hallucinated, and made three suicidal attempts, on each occasion by burning. It appeared from a statement dictated after recovery that he was in a state of extreme fear (of eternal punishment for masturbation). After the failure of his third attempt at suicide he recovered rapidly, and attributed his recovery solely to 'purification by fire'. Subsequently he devoted himself to religious work, believing that he had been converted during his psychosis. He is now a whole-time evangelist. He is small, delicate-looking, and very timid in his manner. His conversation is usually coloured by his religious ideas, and he believes it his duty to convert everyone he meets, at the same time subtly indicating his superiority to other men in affairs of the soul. In his relations with his brother, with whom he is associated in his evangelical work, he is very cautious and timid, and even afraid, so that where he formerly led, he now tries to temper his brother's aggressiveness by submissive tact.

His brother A., who at that time (1904) was aged 36, and had just been promoted to a responsible position in a bank, visited B. in

hospital, and almost immediately himself developed a psychosis—stupor, followed by hypomania. He was not sent to hospital, as he soon recovered. Thereafter he gradually, more and more obviously as time went on, gave vent to strong ideas against the liquor trade, and ultimately refused to do business with those of the bank's clients who were engaged in it. This led to his reduction, and finally to dismissal—twelve years after the psychotic episode. His dismissal led to a second attack of hypomania, from which he soon recovered: but a further change had taken place in him. He says (in retrospect) that his illness was a religious experience, that he was, in fact, converted, and that he felt he had a 'new power', which he likens to that received by the apostles at Pentecost. Ever since his 'conversion' he has tended to be unstable, to be at times mildly depressed, but more usually over-active and excitable. Since then also he has become more and more aggressive in his religious ideas, and to his prejudices against drink he added strong anti-tobacco prejudices, which he did not hesitate to display, so that he latterly became not only objectionable to his friends, but a nuisance to the community. Finally, he passed into a third definite attack of hypomania (eighteen years after the first), and it is this which we have had an opportunity of studying at first-hand, and for which he was admitted to the Royal Mental Hospital, Gartnavel, on April 17, 1922.

The symptoms were classical, and need not be recounted. His mental attitude was strikingly aggressive, intolerant, and self-important. To the doctors he was at times condescending, expressing a hope of their speedy conversion: at other times he was imperative and derogatory, calling them always only by their surname, without prefix, and threatening them with crude forms of corporal chastisement. He had no realization of his position, and set about endeavouring to 'convert' the other patients, rationalizing his presence in the hospital by saying he had a 'mission' there. His pretence at superiority was evident in all his relations: if an epileptic patient refused his ministrations and subsequently had a fit, he rejoiced: if an attendant incurred his displeasure, he referred to him as 'poor so-and-so'.

His letters to his wife were dictatorial, and his attitude to her on her visits was domineering. He made long dissertations to the medical officer on the necessity of a man's asserting his superiority to his wife. He belittled her education and her relations (one of whom had loaned him a large sum of money). To women in general his attitude was derogatory. "I've never aspersed women in my life", he said, "I'm sorry for them. The devil seems to put more obstacles in their path. The very best people agree with me in this. Remember, this has nothing to do with my wife." For his own

father (now dead), on the other hand, he expressed a profound admiration.

Reference to his attacks of pleurisy seldom failed to provoke the remark that the doctor who treated him for it "died of consumption, poor fellow". He was reluctant to admit having had pleurisy (recurrent), but he admitted that on account of it he had not been able to go to evening entertainments even in his youth. Now, however, he declared his lungs to be perfectly sound (he inflicted a slight superficial wound on each side of his chest before admission), but at the same time remarked, "There is no health like spiritual health, brother." His voice also he now declared to be excellent—a formerly existing defect he believed to have been removed by a superficial wound he had made on his neck—and he practised raucously in the ward. He admitted also having had D.A.H. This, curiously enough, he dated from an occasion when he raced two Roman Catholic priests on a bicycle. (He has an intense prejudice against Roman Catholics.) Now, however, he stated his heart was better than ever before.

In this connection, his personal prejudices are striking. Thus he abhors dancing—"sees through the horror of it"—but it appears that in his youth he was unable to attend dances on account of his physical weakness, and he significantly instances the danger of pneumonia after a dance. He gave up smoking, too, because he could not stand it (D.A.H.)—"a nasty taste and a throb at the heart". Alcohol he used only medicinally, and "hated it". It may be suspected that he was afraid or unable to take larger doses.

Complex reaction times in an association test were given with 'wife', 'command', 'children', 'great', 'wish', and 'chest'.

Significance of the cases in relation to each other, and to the conception of the development of the psychoses.—In both these men was present a pronounced 'organ inferiority' from an early age, which necessarily imposed restrictions on their social activities. The sense of inferiority produced was very evident in A.'s case (in B.'s we have not had the opportunity of investigating this point), as is shown above, and was further apparent in the remark that he used to scorn himself for "envying his chums' preferment in society". Both were dominated by the family tradition and by the father's personality; and their sense of physical inferiority when they tried to live up to this tradition would tend to produce a conflict; but their solutions of the problem were different. Both, it is true, reacted with a manic-depressive psychosis; but this is dependent probably on their pre-existent type of personality. A. at least was of the moody type. It is when we seek to explain why one reacted with a manic reaction, the other with a depressive reaction, that Adler's

conception of the neurotic constitution becomes very useful. He finds in neurotics always this 'masculine protest', this desire to be above, the setting of a goal which must be attained. There is also in his conception the masculine-feminine antithesis, so that the goal may be striven for in two ways—directly and aggressively, or indirectly by submission and subterfuge. A. illustrates the first method: he strives by his domineering attitude to assert his superiority. The very things he cannot himself enjoy, the very objects he dare not aspire to on account of his physical defects, he accounts pernicious, and makes them pegs on which to hang his detraction of mankind in general and on which to base his own superiority. This tendency to detraction, to the belittling of others, is very obvious in A.'s case: and it is, as Adler has shown, one of the methods by which the neurotic seeks to gain his fictive goal. In B., on the other hand, who illustrates the second, feminine method, the derogatory tendency uses more subtle means. He first identifies himself with the Father, and then, from this mountain-top of superior virtue, he proclaims, but gently and insinuatingly, that the rest of mankind are inferior to him. In B., too, in the actual psychosis, the sense of inferiority held the field, and until the solution presented itself, action towards the goal was paralyzed.

In A. the tendency to belittle women, and to dominate his wife, may be explained on the same hypothesis. In his actual psychotic spells the flight from the reality of his physical inferiority is even more pronounced, as is well shown above: his "lungs are excellent": his "voice is splendid". Another allied tendency, recognized by Adler, the tendency of the neurotic to measure himself with everyone he meets, is in A.'s case also obvious, e.g., his race with the unwitting priests.

It remains to account for the recurrence of the acute psychosis in A., and its non-recurrence in B. This is obviously due to the nature of the solution which each sought from his conflict. B. by assuming a superlative spirituality and a feminine, unobtrusive way of asserting it, found an easy task: but A., who chose to be aggressive and to flaunt his assumed superiority in the faces of his fellows, is bound to receive far more actual kicks than moral halfpence, so that he is repeatedly reminded of reality, and, in face of constant rebuffs, breaks down.

In conclusion, the interpretation of the psychosis by each of them as a process of religious conversion is interesting, especially in view of recent 'revivals'.

Editorial.

THE NATURE OF DESIRE.

THOUGH the psychologist has devoted much attention to the analysis of conscious states by the method of introspection, there is a diversity of opinion as to the ultimate constituents, stuff, ingredients, or elements of which mind is composed. Thus, one group of psychologists regards sensation as the one, and only basic form of mind; another would add elements known as simple affections; and a third would recognize in addition another element, to which such terms as will, conation, striving, wish, desire, and appetite have been applied. Actually the divergence of opinion is perhaps not so great as might be supposed. To some extent it results from the tendency of certain psychologists to consider mind in terms of content or structure, whilst others emphasize its function or behaviour. Those who would exclude conative elements as ingredients of consciousness do not, of course, deny the existence of anything corresponding to the will of popular belief: but they fail to discover any element like that of sensation which corresponds to the will. This elusive and intangible quality is, in fact, the essence of life and mind. It resists introspective analysis, but it is nevertheless just that fundamental characteristic which distinguishes living organisms from inert matter.

It is perhaps true to say that it is upon this intangible and unanalyzable quality of mind that the structure of modern psychology is based. Briefly, the organism is considered from the dynamic point of view, and the 'wish' has now replaced the sensation as the unit of psychology. Various influences have operated in bringing about this change of viewpoint, and the most striking of these is the work of Freud in the field of clinical psychology, where it has been shown that psychic disturbances are not to be located in the intellectual functions, but rather in the realms of feeling and desire. It has to be recognized, however, that, great as Freud's influence has been, his fundamental assumptions have been subjected to no small amount of criticism, and that they have on the whole failed to gain acceptance. Some of these criticisms are trivial, unimportant, and often based upon prejudice; but others are important, and emanate from those whose opinions carry a great deal of weight. In the second category are to be included certain criticisms made by

Mr. Bertrand Russell, who is deservedly reckoned as one of our most eminent of contemporary philosophers, in his recent volume, *The Analysis of Mind*. Reference may here be made more particularly to his views on the nature of desire.

Mr. Russell recognizes that the general theories of psycho-analysis are of much importance for the theoretical analysis of mind, because it has been clearly established by Freud that a man's actions and beliefs may be wholly dominated by a desire of which he is totally unconscious. In other words, it has been shown that consciousness is not necessarily a characteristic of phenomena to which the term mental may be applied. Granting, however, the value of Freud's researches, Mr. Russell makes the following critical observations: "Freud and his followers, though they have demonstrated beyond dispute the immense importance of 'unconscious' desires in determining our actions and beliefs, have not attempted the task of telling us what an 'unconscious' desire actually is, and have thus invested their doctrines with an air of mystery and mythology which forms a large part of its popular attractions. They speak always as though it were more normal for a desire to be conscious, and as though a positive cause had to be assigned for its being unconscious. Thus the unconscious becomes a sort of underground prisoner, living in a dungeon, breaking in at long intervals upon our daylight respectability with dark groans and maledictions and strange atavistic lusts."

Similar criticisms have frequently been made by psychologists and others who are accustomed to express themselves in scientific rather than popular language. It is felt that Freud's nomenclature and descriptions are based largely upon metaphors which tend to give rise to the impression that the new facts which have been discovered need no further elucidation; and it is considered that such facts should be capable of being understood without assuming the existence of a mythical entity endowed with anthropomorphic qualities. These are valid criticisms, and it is obviously undesirable to personify so intangible a concept as the 'wish' or desire if it can be avoided. A science begins to progress when its terminology is clearly defined, and as that is what Mr. Russell endeavours to do in respect to the term desire, his work is not merely critical but definitely constructive.

Mr. Russell develops the view that desire is to be understood as a causal law of our actions, and not as something existing in our minds. He finds that the study of animals is in many ways the best preparation for the study of desire. "A hungry animal is restless until it finds food; then it is quiescent. The thing which will bring a restless condition to an end is said to be what is desired. . . . The characteristic mark by which we recognize a series of actions which display hunger is not the animal's mental state, which we cannot

observe, but something in its bodily behaviour; it is this observable trait in the bodily behaviour that I . . . call hunger, not some possibly mythical and certainly unknowable ingredient of the animal's mind." A consideration of desire as exhibited in animals makes it clear (and this is the essence of Mr. Russell's theory) that *unconscious desire is the natural and primitive form of desire*. (A pure example would be a hen sitting on eggs for the first time.) Such a view of the nature of desire would seem to differ fundamentally from those of Freud, because it renders it unnecessary to assign a positive cause for the existence of an unconscious desire. The following quotations indicate the view in the mind of the author: "What is called an 'unconscious' desire is merely a causal law of our behaviour (cf. Hart, *The Psychology of Insanity*), namely, that we remain restlessly active until a certain state of affairs is realized, when we achieve temporary equilibrium. If we know beforehand what this state of affairs is, our desire is conscious; if not, unconscious. The unconscious desire is not something existing, but merely a tendency to a certain behaviour; it has exactly the same status as a force in dynamics. . . . It is not necessary to suppose, as Freud seems to do, that every unconscious wish was once conscious, and was then, in his terminology, 'repressed because we disapproved of it'. On the contrary, we shall suppose that, although Freudian 'repression' undoubtedly occurs and is important, it is not the usual reason for unconsciousness of our wishes. The usual reason is merely that wishes are all, to begin with, unconscious, and only become known when they are actively noticed."

Here then is a theory of desire which deserves serious consideration, because it does much to dissipate the atmosphere of mystery which pervades current conceptions of the 'unconscious'. The theory has, furthermore, the advantage of being thoroughly biological, because it is based upon the view that man has developed out of animals, and that there is no serious gap between him and the amœba. This is definitely the case in respect to structure and behaviour, and it is probably so in the sphere of mind.

Abstracts.

Neurology.

PHYSIOLOGY.

- [70] The present status of epicritic and protopathic sensibility, and a method for the study of protopathic dissociation.—J. BYRNE. *Jour. Nerv. and Ment. Dis.*, 1922, IV, 1.

THE author points out how Head and Sherren's division of sensibility into epicritic, protopathic, and deep has been criticized: but considers that on the whole their views have stood the test of time in respect of their theory of dissociation, though not in their classification. He considers that the fundamental thing in protopathic sensibility is the unlocalized, unmeasurable, uncontrolled hurt or affective element, as opposed to the introspective, measurable, more or less well-defined sensation of sharpness or pointedness, and of warmth and cold, each of which must be classed with the critical elements. He points out that in syringomyelia and thalamic dissociation the critical pathways, both superficial and deep, retain their anatomical and functional individuality all the way from the periphery to the thalamus, thus disposing of Head's hypothesis of re-grouping in the spinal cord. The author regards protopathic sensibility as undifferentiated affective 'hurt', and considers any differentiation involves the presence of epicritic elements in the sensation. In peripheral-nerve lesions epicritic sensation is abolished, while in spinal lesions protopathic affective sensation is abolished, as in, e.g., syringomyelia. It sometimes happens that the reverse of this is observed, so that there are evidently separate paths both peripherally and centrally for the two types of sensation—the protopathic path having its main terminus in the thalamus, and the critical in the cortex, and each set may be divided into superficial and deep forms. The author insists on the value of introspective analysis of the sensation: thus, in testing warmth by the usual method in a normal area the first sensation noticed is touch, then warmth, then 'hurt', which is overshadowed and controlled by the other two: whereas in an area whose nerve-supply was injured the 'hurt' would overshadow the others. He describes this graphically thus. —

SENSATION		NORMAL AREA	AFFECTED AREA
Touch -	-	— + +	—
Warmth -	-	— —	—
Hurt -	-	—	— — —

and so for other sensations.

It must be remembered that in any case of dissociation of sensibility one of the elements preponderates, but is not present to the exclusion of the other. The author suggests the following tests for eliciting his four forms of sensibility: cotton-wool touch for 'superficial critical'; pin-pricking for 'superficial affective'; posture for 'deep critical'; pinching for 'deep affective'. He suggests that the use of these, in conjunction with the introspective analysis recorded as above, will give all the information required about sensation.

R. G. GORDON.

[71] The physiopathology of tickling (*Sulla fisiopatologia del solletico*).

—L. INSABATO. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 121.

Owing to the supposed variability of this phenomenon it has not received much attention. The author carried out observations on normal individuals and on those suffering from a variety of pathological conditions. Superficial tickling is induced by light touch and lasts some time after removal of the stimulus, but is immediately stopped by pressure. It is difficult to define the sensation, but it is most closely allied to itching. It may be produced by the subject himself. Superficial and deep ticklishness are two separate phenomena. Deep tickling involves complex nervous arcs, and is of the nature of a reflex action involving a definite psychical process. As a rule it cannot be produced by the subject himself. Tickling of the soles of the feet should be considered as belonging to the class of deep tickling. Taking abdominal ticklishness as an example, the author found that the excitability of the abdominal reflex and the ticklishness corresponded, and that the point of reception of stimulus was not the skin but the muscles. The two, however, are not identical, for in some parts of the body reflex muscular action is found without ticklishness, and in others ticklishness without reflex muscular action. The areas of most marked ticklishness are those where there are large aponeuroses or insertions of large tendons, and the author seeks to identify ticklishness with the special sensations belonging to tendons. The receptive end-organ of the tickling 'engram' is situated in the tendon aponeurosis or periosteum, and not in skin or muscle. The author then notes the affective accompaniments of tickling, and reviewing the observations on the double innervation of muscles (motor and static or vegetative), concludes that tickling is a 'sympathetic reflex'. He quotes certain of his observations on patients to show that variations occur in the reactions to tickling which correspond to interference with the functions of the basal nuclei and alterations in the affective reactions generally. Under ordinary circumstances tickling is associated with laughing, and if persisted in too violently this will turn to crying. Accompanying these states intense 'sympathetic' activity is to be observed; in pathological cases crying may be the first reaction. The laughing of tickling is not the controlled phenomenon of ordinary psychical laughter, but an explosion almost epileptic in character. The author concludes that the 'centre' for the phenomenon of tickling is in the basal ganglia and near the 'centres' for laughing and crying. Evidence for the bilateral position of this, probably in the caudate nucleus and putamen, is adduced.

The author next seeks to draw an analogy between the reflex of tickling and the hysterical attack and other phenomena of hysteria. He regards tickling as perhaps the only remaining phenomenon of primordial non-differentiated emotivity, and thinks that in hysteria there is a dissociation liberating similar undifferentiated emotivities, and that the 'pathology' of hysteria may be found to be in a failure of function of the basal ganglia. He does not think that the phylogenetic significance of tickling is teleological, but that it is an expression of primary undifferentiated emotivity to which utilitarian objectives have been added secondarily (defence, eroticism, play, and strife).

R. G. GORDON.

PATHOLOGY.

- [72] Review of the actual findings in the pathological anatomy of the nervous system in dementia præcox (I dati attuali sull'anatomia patologica del sistema nervoso dei dementi precoci).—V. M. BUSCAINO. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 87.

New findings as to the distribution and genesis of the "patches of disintegration in the form of bunches of grapes" in dementia præcox (Nuovi dati sulla distribuzione e sulla genesi delle "zolle di disintegrazione a grappolo" dei dementi precoci).—V. M. BUSCAINO. *Ibid.*, 57.

THE author reviews the reports of about 550 autopsies and concludes as follows: (1) In many cases of dementia præcox a predisposition or constitutional abnormality of the central nervous system is anatomically demonstrable. (2) It cannot be asserted that the disease depends on infection from the appearance of the meninges, the vessels, or the cerebral parenchyma. (3) The lesions found are of a degenerative nature. (4) In the cerebral cortex the layers specially affected are the 6th, 5th, and 3rd. The lesions of the various layers do not throw light on the dissociative phenomena of dementia præcox, probably because its fundamental pathological anatomy has not yet been described. (5) The finding of lesions in the corpora striata may be of considerable importance in connection with the genesis of muscular hypertension in catatonic cases. (6) Not uncommonly important lesions are found in the grey matter of the medulla, spinal cord, and sympathetic ganglia which may be of significance in connection with the vegetative disturbances in the disease.

The author considers that the most important changes are the patches of disintegration 'a grappolo' (like bunches of grapes): these are met with in three varieties, whose histological properties he describes, and occur frequently in cases of dementia præcox, but rarely in such conditions as G.P.I., epileptic dementia, etc. They are found chiefly in the white matter of the cortex, less commonly in the basal ganglia, and rarely in the grey matter of the cerebrum or cerebellum. In catatonic dementia præcox the patches are chiefly in the corpus striatum and globus pallidus.

Lesions occur frequently in the dentate nucleus, the olives, etc., and the author thinks these may be associated with cataleptic manifestations. In certain cases with changes in the reflexes corresponding changes have

been found in the pyramidal tracts, etc.: in cases of acute delirium multiple early lesions have been found.

The author gives various proofs that the lesions described by him are not post-mortem developments or artefacts due to fixation in formalin or other reagents. The brains of dogs were examined after poisoning with various substances, and characteristic lesions were found in those poisoned by formic acid—a process inducing one variety of acidosis.

R. G. GORDON.

- [73] On a case of fibrous tumour of the brain of a cheloid type following a gunshot wound (*Sopra un caso di neoformazione fibrosa dell'encefalo a tipo cheloidico per ferita d'arma da fuoco*).—G. CAMPORA. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 79.

SCARS of the brain are usually formed of glial tissue: but if the lesion is large and near the cortex, connective tissue may also be found in its composition. In some cases the connective tissue shows a considerable excess of fibroblasts and new vessel-formation. This may explain the occurrence of the changes in the case described of a young woman who had been shot in the frontal area by a sporting gun, and five years later developed severe epileptic fits, during one of which she fell and fractured her skull with fatal results. Post mortem a dense fibrous tumour was found which resembled a cheloid and had evidently been actively growing. This may have accounted for the late development of epilepsy, and may throw light on the late developments of severe cranial wounds.

R. G. GORDON.

- [74] On the nature of choreiform movements (*De la nature des mouvements choréïques*).—ANDRÉ-THOMAS. *Presse méd.*, 1922, xxx, 25.

THE author recites the numerous members of the group of disorders commonly included under the term choreiform movements (Sydenham's chorea or chorea proper, Huntington's or hereditary chorea, chronic chorea, infantile athetoid chorea, post-hemiplegic chorea, encephalitic chorea, etc.). Sydenham's chorea is no longer considered a functional disorder. The association of the rheumatic diathesis with the demonstration of pathological lesions in the nervous system and of changes in the cerebrospinal fluid carries this disorder into the domain of organic diseases. In a former communication, the author has divided the involuntary movements in this disease into two groups: (1) Disordered, irregular, purposeless, involuntary movements which are amenable to rest and to voluntary control; (2) Shock-like contractions which are not so controlled, and which affect particular muscle groups, especially the shoulder muscles.

With a view to the further elucidation of the component factors in choreiform movements, a study of two cases is put forward in which the cinematograph's aid has been used. The patients are two women, who have lesions localized in the hypothalamic region. Both patients present movements which the author considers to be typical of Sydenham's chorea, viz., adduction and rotation movements of the limbs. In the

first case the movements do not occur at rest, but are immediately brought out by any movement which disturbs the patient's passivity. In type they resemble the position assumed by decerebrate animals (Sherrington), and also by patients with lesions comparable to decerebration (Kinnier Wilson). They reproduce very closely indeed the movements seen in Sydenham's chorea, while a further similarity is the occurrence of pronounced associated movements in the limbs affected. The onset of the condition was sudden, and suggested a unilateral vascular lesion in the hypothalamus.

In the second case, the movements followed an attack of lethargic encephalitis. Here again nothing is noticeable when the patient is at rest, but the slightest mental effort—as opposed to the physical movement required in the first case—suffices to bring out the movements on the affected side.

The choreic movements in these two cases suggest that the lesion in Sydenham's chorea must have a similar location (namely, in the hypothalamic region), and that choreiform movements represent the uncontrolled reflex activity of the mid-brain.

W. JOHNSON.

[75] Intracranial aneurysm of the vertebral artery.—II. GIDEON WELLS. *Arch. of Neurol. and Psychiat.*, 1922, vii, 311.

THE author reports a case of aneurysm of the left vertebral artery which appears to be one of the largest on record. A coloured man, with no evidence of syphilis, but with a history of severe cranial traumatism many years before, died of bronchopneumonia without giving marked evidence of increased intracranial pressure or of any cranial nerve paralysis during his last illness. Necropsy revealed a large vertebral aneurysm, 35 mm. in its vertical diameter, causing much deformity about the cerebellopontile angle, compressing the sixth to ninth cranial nerves, occluding the left vertebral artery, and, by pressure on the aqueduct of Sylvius, causing internal hydrocephalus. The presence of a distinct grooving in the floor of the skull indicated that the aneurysm had been present for a long time.

No adequate neurological examination was made: but three weeks before death, difficulty in speech and swallowing, with decreased vision, were noted. Wells remarks that this aneurysm bears out the statement that intracranial aneurysms are not usually the result of syphilitic arteriosclerosis, but are often associated with a history of antecedent cranial trauma. A fairly complete review of the literature of this subject is made, but the important contribution by Fearnside receives no mention.

R. M. S.

SYMPTOMATOLOGY.

[76] The sequelæ of epidemic encephalitis resembling Parkinson's disease (I postumi parkinsoniani della encefalite epidemica).—R. LAMBRANZI. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 168.

In the author's experience 45 per cent of the persistent sequelæ of epidemic encephalitis are of this type. He cites notes of ten cases, and remarks

that inasmuch as the face is always involved even when the symptoms are chiefly one-sided or confined to one limb, the lesion must be intracranial. Apart from the history of encephalitis as an etiological factor, the condition may be differentiated from true paralysis agitans. In post-encephalitic cases one or other of the characteristic symptoms is absent, and others, such as temperature disturbances, intermittent hyperidrosis, etc., are present: tremor is inconstant, and is not so definitely associated with muscular rigidity.

The author thinks that the tendency is for the condition to become stationary or to progress in spite of remissions. The evidence as to the location of the lesion seems to point conclusively to the corpus striatum. Treatment is of no evident value, and the author has not found any lasting help from thyroid, parathyroid, or intravenous injections of cacodylate of soda. He thinks, however, that experiments should be tried with some of the derivative preparations of salvarsan.

R. G. GORDON.

[17] **Parkinson's disease: a clinical study of one hundred and forty-six cases.** —H. T. PATRICK and D. M. LEVY. *Arch. of Neurol. and Psychiat.*, 1922, vii, 711.

ONE hundred and forty-six private cases of 'classical' paralysis agitans were used for studies in age and sex distribution: 140 for clinical studies. Frequency by decades was found to be greatest in the fifties, and next in the forties: 80 per cent of the patients were between 40 and 70, and 55 per cent over 50 years of age. These findings agree with other statistics. Considered in relation to the age incidence of the general population, the vast majority of patients are over 50 when the disease begins, and the onset is relatively more frequent in the seventies than in the thirties. The ratio of males to females was 3 to 2. Trauma occurred in 22 cases, and in these as in the histories of infected parts it was shown that the symptoms of paralysis agitans tend to start in a traumatized or diseased part. Since in this series there was a history of trauma in only 15 per cent of all cases, it cannot be concluded that trauma is predisposing in any sense except as to the site of the initial symptom.

A large number of mental symptoms were shown by 48 patients, or in 34 per cent of the cases. In contrast with the findings in other studies, mental symptoms were found to occur as frequently before as after the onset of the disease. These symptoms were largely in the form of depressive reaction. Menstrual disturbances were found to be of no special significance. Heredity findings were not significant except in the form of 'neuropathic heredity' in about 25 per cent of the cases. Direct heredity of the disease was traced in 6 cases. The complications were: tabes, 1; hemiplegia, 2; trifacial neuralgia, 2; hyperthyroidism, 1; and diabetes, 1. Fifteen patients had hemiparalysis agitans; 18 cases were accompanied by intention tremor; 5 patients had one-sided facial involvement; 4 had paralysis agitans sine agitatione, 2 paralysis agitans sine rigiditate, and three had 'bulbar symptoms'.

R. M. S.

- [78] **General symptomatology and differential diagnosis of disseminated sclerosis.**—B. SACHS and E. D. FRIEDMAN. *Arch. of Neurol. and Psychiat.*, vii, 551.

THE authors discuss the signs and symptoms of multiple sclerosis in the order of their diagnostic importance. In a series of 141 cases, fatigue or weakness and stiffness of one or both upper or lower extremities was present in 81.7 per cent. Marked diminution or loss of the abdominal reflex occurred in 83.7 per cent, and an extensor type of plantar reflex in 78.3 per cent. An increase of the deep reflexes was the common sign, being present in 90 per cent of their cases. Intention tremor occurred in 55.3 per cent, and dysarthria or scanning speech in 36 per cent. In discussing the differential diagnosis between this disease and multiple cerebrospinal syphilis, Sachs credits Pierre Marie with the statement that all cases of multiple sclerosis occurring above the age of 30 years are syphilitic in origin. Stress is laid on the following distinguishing features: In disseminated sclerosis the pupillary reactions are universally normal, whereas in fully 90 per cent of cases of cerebrospinal syphilis immobility of the pupils is an early and constant symptom. If there is an irregular contour of the pupil as well, the suspicion of a syphilitic disease is fully corroborated. The ocular palsies in syphilis are early and complete; in disseminated sclerosis they are partial and transitory. In disseminated sclerosis the serological findings are practically negative; in cerebrospinal syphilis they are, as a rule, positive enough to confirm the diagnosis. The spasticity of cerebrospinal syphilis is greater than in disseminated sclerosis unless the patients are in or near the terminal stage of the disease. In the early stages of disseminated sclerosis there is weakness and only a slight degree of spasticity; in cerebrospinal syphilis there is marked spasticity and relatively less weakness.

R. M. S.

- [79] **Multiple sclerosis: the location of lesions with respect to symptoms.**—E. W. TAYLOR. *Arch. of Neurol. and Psychiat.*, 1922, vii, 561.

THE author remarks that it is difficult, if not impossible, to correlate accurately the clinical symptoms with the post-mortem findings in cases of disseminated sclerosis. A precise determination of lesions from symptoms or of symptoms from lesions is not possible on account of the peculiar type of degeneration in the disease, particularly the long persistence of axons, the resistance of cells, and the multiplicity of lesions which confuses the clinical picture. Brouwer's explanation of the frequency of certain symptoms is perhaps as satisfactory as any. He believes that it may be possible to explain the chief symptoms of the disease through an appeal to evolutionary principles. Presupposing that multiple sclerosis is due to an infective agent of some kind, it is legitimate to assume that the older parts of the nervous system have greater resistance to such agents than the phylogenetically and ontogenetically younger parts which naturally represent the higher, more developed functions. The function of speech is a late development, whereas the cranial nerve tracts are for the

most part archaic. Hence, lesions apparently affecting this whole area in common involve speech in a maximum degree. Again, the abdominal reflex occurs only in primates: hence it likewise is a late phylogenetic development, and is therefore lost early. Horizontal nystagmus is brought into relation with the fact that the side movements of the eyes in the horizontal plane is present only in higher mammals on account of the position of the eyes in the front of the head. That the disturbances of motility are greater and more frequent than those of sensibility is due to the fact that the pyramidal tracts are young both from the racial and individual standpoint. The cerebrocerebellar tracts in the pons are conspicuously developed in the higher mammals, and particularly in man: therefore there is a frequency of disturbed co-ordination, since these tracts, developed late, are often involved in the sclerotic process. Finally, the much-discussed temporal pallor of the optic disc finds its explanation in the imperfect crossing of the optic fibres in the mammalia, including man. Phylogenetically, the temporal half of the disc is the younger: hence, according to the theory, it suffers more in the pathological process than does the nasal side. The well-recognized mental changes are naturally explainable on the same basis.

R. M. S.

- [80] The mental symptoms of multiple sclerosis.—SANGER BROWN, JR., and T. K. DAVIS. *Arch. of Neurol. and Psychiat.*, 1922, vii, 629.

IX 90 per cent of multiple sclerosis there are mental alterations, but because of the accompanying physical disability disorders of conduct leading to commitment are rare. In the Manhattan State Hospital there were only three cases of multiple sclerosis among the 6,700 insane patients. Euphoria, sometimes even resembling that seen in mania, is perhaps the commonest mental symptom. Even when completely helpless, these patients are often optimistic, cheerful, and not in the least concerned about their condition. Depression is also seen, but is unaccompanied by great retardation, and even in these cases euphoria tends to develop as the disease progresses. Mental deterioration is very variable in degree, and auditory hallucinations without insight are not unusual. The mental symptoms which are incidental and secondary may be placed in a secondary group, and probably depend to a considerable extent on the mental make-up of the patient before the disease developed. To this category belong transitory delusional states, depressions, and delusional trends having a certain resemblance to dementia praecox.

The authors quote illustrative cases, and supply a fairly complete bibliography.

R. M. S.

TREATMENT.

- [81] Comparative clinical observations on involvement of the nervous system in various phases of syphilis.—JOHN M. STOKES and ALBERT R. McFARLAND. *Amer. Jour. Syph.*, 1922, vi, 169.

This paper is based on the routine examination of a series of 231 cases of early syphilis at the Mayo clinic. They find that in very early untreated cases of secondary syphilis the spinal fluid shows evidence of syphilis (most

often pleocytosis) in from 60 to 70 per cent of cases, falling to 40 per cent within the first six months, and to 25 to 30 per cent after the first year or two. From this time on the decline is more gradual. These alterations are often associated with absence of clinical signs pointing to affection of the nervous system. In fact only 16 per cent of early cases showed such symptoms. Their observations suggest that when syphilis involves the nervous system it usually does so at an early stage, and that in patients who are free from nervous involvement during the whole of the secondary stage, thorough early treatment prevents such involvement at a later stage. They advise examination of the cerebrospinal fluid in all cases of syphilis before the patient is discharged from a first course of treatment, as the nervous system appears to be much more amenable to treatment at this than at any later stage in the disease.

J. G. GREENFIELD.

- [82] The value of neurological examination in syphilis.—RANDAL HOYT. *Amer. Jour. Syph.*, 1922, vi, 273.

THE author cites several illustrative cases to show that the asymptomatic nature of neurosyphilis is not so common as is believed. Neurosyphilis, even in the early stages, is nearly always symptomatic, but as these symptoms are, more frequently than not, atypical, they are not revealed by the conventional clinical methods of examination. He insists that the only method of detecting early neurosyphilis "is that which tests, routinely, all functions of the nervous system and all chemical reactions in the cerebrospinal fluid."

J. G. GREENFIELD.

- [83] Intraspinal therapy in syphilis—J. A. FORDYCE. *Amer. Jour. Syph.*, 1922, vi, 198.

THIS paper is a reply to the recent criticism by Dereum of the intraspinal treatment of neurosyphilis. Fordyce does not place any faith in such treatment in the parenchymatous stages of neurosyphilis, but considers it of great value in clearing up early syphilitic meningitis. He states that in some cases he has obtained complete cures when prolonged treatment by intravenous arsphenamine and mercurialization had failed. He does not, however, in this paper give either statistics or references bearing on the subject.

J. G. GREENFIELD.

- [84] A study of the internal stigmas of degeneration in relation to metabolism and disturbance of the cerebral cortex in children.—EDNA R. JATHO and S. DEW LUDLUM. *Arch. of Neurol. and Psychiat.*, 1922, vii, 167.

BY the term 'internal stigmas' the authors refer to the deformities in various regions of the digestive tube which may be observed by use of the Röntgen ray; and in their experience visceral ptosis, intestinal stasis, and so on, are quite common in children exhibiting mental or nervous symptoms. They believe that measures devoted to the relief of such gastro-intestinal disorders may cause the mental retardation and other

psychic disturbances of childhood to disappear. Five brief case reports are presented, but in only one is it definitely stated that the mental state benefited from this form of treatment.

R. M. S.

- [85] **The treatment of general paresis by the intracistern route.**—F. G. EBAUGH. *Arch. of Neurol. and Psychiat.*, 1922, vii, 325.

WITH the object of obtaining a wider dissemination of salvarsanized serum, Ebaugh made his injections into the cisterna magna in twenty-eight cases of general paralysis. In all, 250 punctures were performed without accident of any kind. The clinical and serological results were disappointing, but seemed to justify further use of the method.

R. M. S.

- [86] **Lumbar puncture in ventricular hæmorrhage** (La puntura lombare nelle emorragie ventricolari).—C. DI SANCTIS. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 331.

THE presence of blood in the cerebrospinal fluid is much more common as the result of secondary effusion from an ordinary cerebral hæmorrhage than of a primary rupture of the vessel in the wall of the ventricles or in the choroid plexus. Bleeding into the ventricles can be recognized clinically by such signs as deepening or renewal of unconsciousness, by spreading of the paralysis to the opposite side, by Cheyne-Stokes breathing, and by tachycardia, etc., but the decisive diagnostic evidence is the character of the fluid. The presence of blood in the spinal fluid is a certain proof that the hæmorrhage has invaded the ventricles. In such cases the prognosis is very grave, and most authors agree that death is a matter of hours. Charcot published a case which recovered, and the author describes three others. He concludes that hæmorrhage into the ventricles may be spontaneously arrested and the focus become encysted as in an ordinary cerebral hæmorrhage. The presence of blood diffused in the fluid may produce a serious syndrome of meningeal irritation. Lumbar puncture may mitigate or remove all immediate danger of death if the oozing of blood from the vessel is arrested, and may favour the elimination of the hæmorrhagic focus, and with this the recovery of the patient.

The prognosis of bleeding into the ventricles is bad, not only because of the increased pressure produced by the escaping blood, but also because of the meningeal irritation which ensues, and which causes increased secretion of fluid and so still further increase in the pressure. With reference to this irritative effect of blood on the meninges, the author noticed that in many cases of head wounds during the war where blood was present in the fluid, lumbar puncture prevented in many cases the neck rigidity and rise of temperature which were supposed to be due to the onset of septic meningitis. He thinks that the risk of increasing the hæmorrhage by reducing pressure to the extent of removal of 12 c.c. or less of fluid is negligible, since the pressure in a small artery is not more than 100 mm., as compared to 100 to 130 mm. in the ventricular system. On the other hand, any increase of pressure must be detrimental to the delicate vital structures on the floor of the 4th ventricle.

R. G. GORDON.

Endocrinology.

[87] A correlative study of endocrine imbalance and mental disease.

—LEWIS and DAVIES. *Jour. Nerv. and Ment. Dis.*, 1921, liv, 385.

THE authors briefly review the history of the study of the ductless glands and their relation to mental disease. Twenty-two cases were chosen which showed frank endocrine abnormalities, and they were examined physically, psychologically, and chemically. The following tests were used: sugar tolerance test of Janney and Isaacson; thyroid function test of Harrower; uric acid in blood test of Folin and Wu; urea nitrogen in blood test of Folin; creatinine in blood test of Folin and Wu. The twenty-two cases are described in detail, and from their study the authors conclude that:—

1. Since the activities of the nervous system, and particularly those of the autonomic division, are closely associated with endocrine functions, one must suppose that maladjustments of the individual to certain situations will produce a response in the glands varying according to the strength of the impulse, development, vigour, and physiological activity and balance existing between the component parts of the gland: and on the other hand, original defects in these glands, connected as they are with external form, and visceral and metabolic functions, must produce limitations in the action-systems and peculiarities of behaviour.

In many case of mental disease, regardless of the priority of the mental disturbance or of the endocrine imbalance, there is certainly a circle of abnormality established, the arcs of which are composed of both groups of factors.

2. In glandular disturbances the effects are due to a change in rate of normal function, and as thyroid extract is an accelerator principle, the stimulating action of which is intracellular, and the effect of which is not felt in any particular set of organs or tissues alone, it is reasonable to suppose that its administration in hypoglandular types accelerates the organism in general, rendering introversion more difficult, and aiding the application of psychotherapy. This is well illustrated in several cases in which changes in behaviour and improvement began simultaneously with the thyroid-testing experiments.

3. For every case manifesting profound glandular disturbance there are doubtless dozens that show only little signs, and it is in these cases that a psychological or chemical attempt to break one of the arcs of the circle is more likely to result in success.

4. Both the sugar-tolerance test and the thyroid-function test have been found extremely valuable in differentiating and in sizing up the hypo- and hyper-glandular types, in which often instead of a profound, easily recognized disturbance, only the little signs may show. It is in these that scientific application of glandular therapy has its earliest and best opportunity.

5. Occupational therapy, when applied by a therapist well trained in observing patients with mental disorders, has been found of value in an

experiment of this sort, not only from a therapeutic standpoint, but as an early indicator of variations in behaviour. The attitude of the patient, fluctuations in interest and attention, and signs of improvement are early recognized by apt workers in this field.

R. G. GORDON.

[88] Endocrine stimulation as affecting dream content.—CAROLINE S. FINLEY, *Arch. of Neurol. and Psychiat.*, 1921, v, 177.

THE patient, a single woman of 15, was given one grain of pituitary extract a day to combat the indefinable languor and lassitude of which she had complained for some weeks. After ten days of this treatment she began to have vivid dreams every night, a thing she previously used to do only about once a month. These dreams were all of a delightful character: she would see herself travelling, and sometimes she would be wandering in strange and beautiful places; in all she felt wonderfully happy and exhilarated. A point of interest is that it was when under this treatment that for the first time she dreamt of colours; these were clear and vivid. One dream, however, differed from the rest: in this one she saw herself with her mother and sisters, and was expecting the birth of a child; no thought occurred to her concerning the possibility of the child's having a father, and her mind seemed mostly centred on the ease with which she was going to have her baby: she could recall no definite details on awaking. As, however, intention tremors occurred later, the patient was taken off pituitary extract, and given suprarenal gland. At this stage the dreams changed in character and were less vivid, not so distinctly recalled, contained little sense of colour, and were distinctly unpleasant. The actual incidents were often not remembered, and the patient would wake up with only an inexplicable though acute horror or fear. She sometimes dreamt that she had committed a crime, that she had quarrelled violently, or that she was awaiting some terrible news: once she saw herself as a man: another dream depicted her with a misshapen dwarf child clinging round her neck.

When the glandular treatment was stopped, the dreams ceased also, except at her menstrual periods, when they were vivid and pleasant, just as they had been when she had been taking pituitary extract: but after a few months even these disappeared.

The author draws attention to the dream contents of the first period, and the action of the pituitary extract on the ovaries, and she points out that the cause of the dreams was not psychic trauma, but ovarian stimulation, with the consequent (?) bringing up to dream consciousness of general and universally unfulfilled desires; and she adds that this explanation should not be lost sight of in the enthusiasm of Freudian interpretation.

Without entering into the question of the possible interpretation of these dreams according to the different psycho-analytical schools, one might point out that though the glandular administration may well account for the production of dreams, yet the form of these dreams, and still more their incidental contents, must have had an unconscious source, and that this origin must be explained by means of a symbolic interpretation, Freudian or otherwise.

An extensive study of dreams brought about under such conditions might reveal minor differences and peculiarities capable of elucidation only on the assumption of particular repressions and personal complexes. These complexes would be probably derived from some primitive instinct which education causes to be repressed, and as long as that repression were *successfully* carried out, and no undue stimulation of that complex occurred, the individual would be normal and healthy. But when that buried trend is stirred up by the medicinal production of the physical changes corresponding to the emotions relating to that hidden trend, then, and then only, will it tend to express itself in dreams. And in so far as no repression can be carried out in exactly the same way and under exactly the same conditions in a number of persons, then each dream will bear the imprint of the individual developmental peculiarities of the dreamer.

We find here also marked support for the view that the mental affect we term an emotion is dependent upon, and not the cause of, a series of physical changes produced by glandular activity and the corresponding activity of the associated segments of the autonomic system.

J. E. NICOLE.

[89] The importance of endocrine therapy in combination with mental analysis in the treatment of certain cases of personality deviation.—EDITH R. SPaulding. *Amer. Jour. Psychiat.*, 1922, i, 373.

THE patient who suffers from an endocrine disorder which is associated with mental symptoms is rarely given the benefit of both glandular treatment and a mental analysis, utilized concomitantly as necessary elements of a rational scheme of re-education. While the experimental work which has already been done has shown the close relationship between the emotions and the glands of internal secretion, it has not been carried far enough to give in many instances a satisfactory basis for treatment. The therapeutic results, however, already obtained in certain definite conditions, suggest a promising foundation for the treatment of the innumerable deviations which individual cases present. A close relationship is observed between the vegetative nervous system and personality development. In the hypothyroid state there is often found a sluggish mentality and slow physical response, while the over-active mental state and rapid physical response are associated with hyperthyroidism. Associated with this, fear and apprehensive states are often found, with a resulting temperament making adjustments to everyday life difficult. Similar remarks apply to dyspituitarism, which may be associated with sexual imbalance and difficulties in emotional inhibitions, both perhaps leading to mental deviation and adaptational problems. Though Adler has pointed out the many traits that may result from glandular inadequacy, there still remains an almost unexplored field in the study of personality to be reached by the psycho-physical route. Five cases are cited to demonstrate the value of endocrine therapy together with mental analysis.

C. S. R.

- [90] The inter-relation of the endocrines and the vegetative nervous system.—WILLIAM V. P. GARRETSON. *N. Y. Med. Jour.*, 1922, cxv. 344.

THE writer points out that with the advent of more exact methods of research into the functional values of the endocrine glands, many pages of physiology must be re-written, and results bid fair to revolutionize the practice of medicine. To study the functions of brain, spinal cord, and peripheral nervous system *intelligently*, neurologists, psychiatrists, and alienists must have as intimate a knowledge as possible of those factors which constitute endocrine balance. Even now, he says, we may attempt to designate patients in terms of glandular types such as thyroidal, pituitary, suprarenal, thymic, and gonadal, and by means of certain physiological and structural markings observed in physical objective examination alone, without other information, we may make an accurate designation.

There are two great subdivisions of the vegetative nervous system, anatomically distinct but physiologically antagonistic and normally in counterbalances. These are (1) the sympathetic, and (2) the autonomic or parasympathetic or vagus. Both innervate the non-striped muscles of the body, all endocrine as well as duct glands, the viscera, heart, blood-vessels, and genital organs. "The vegetative nervous system is an out-growth from the cerebrospinal system, with which it remains connected by afferent and efferent fibres. A number of specialized vegetative nerve-cells remain within the cerebrospinal axis, thereby accounting for the occurrence of vegetative phenomena in certain central diseases" (Stewart).

A short but concise description of the two subdivisions then follows, and the endocrine system is regarded as, in part at least, structurally and functionally identical with the vegetative nervous system, influencing the function of the latter by the hormones created by its glands. The suprarenal glands are most definitely noticed as being part of the sympathetic, because the paraganglion cells of the latter secrete adrenalin. There is also reason to believe that the posterior portion of the pituitary gland dominates the autonomic portion of the vegetative nervous system.

The writer states that it was in his dealings with neurotics that his interest in endocrine function was aroused. He came to the conclusion that in a great many cases purely psychological treatment was not successful, and that success could be attained by psychological methods only if combined with recognition of the endocrine dysfunction associated with the neurosis.

With the Freudian school, of which at one time he was an ardent disciple, he was thoroughly in accord in attributing all neuroses to underlying psychic traumata, usually of sexual origin, to repressions, and their consequent maladjustments. In other words, the psyche harboured the hidden etiology as repressed complexes to which all somatic symptoms were correlated. To release the subconscious current by psycho-analysis was to effect a cure! *Prolonged observation has convinced him that the elimination of the psychic irritant is only a small part of the problem.* The recognition of a physical basis as revealed by disturbed endocrine function elucidates the symptomatology of these patients. The continued assault of

the psychic irritant will not express its symptomatology until it has been sufficient to undermine the endocrine balance. After the removal of the psychic irritant, regardless of the method, the return to normal health will not occur until the endocrine readjustment is effected. The profoundly irritant effects of accumulated psychical and physical traumata were not expressed in the war-neuroses until endocrine exhaustion occurred. To analyze the psychic content enlightens the patient as to the psychology of his 'complexes', and thus may relieve mental tensions through knowledge of the nature of the symptoms; but it by no means necessarily enables him to effect control of his psychic processes and hold his obsessions in abeyance!

A list of commonly observed symptoms, depending on whether the vagus or sympathetic is in dominance, is then given. All states of *hypoadrenia*, regardless of etiology, are stated to lower the sympathetic tone and to create a vagotonia, which may be segmentally expressed as a local vagotonia, or as a general vagotonia when all segments are affected. *Hyperadrenia* produces a sympatheticotonia. *Hypopituitarism* produces lowered vagal tone with resulting sympatheticotonia, while *hyperpituitarism* creates a vagotonia. Examples of compensatory and inhibitory reactions are given to show the intimate inter-relation of function between certain endocrine glands, particularly the thyroid, suprarenals, pituitary, and gonads.

The writer concludes by saying that annoying symptoms may be eradicated by creating an endocrine balance in a manner that is frequently unmeaning and spectacular, as well as quite impossible by any other method at our disposal.

JAMES YOUNG.

Psychopathology.

PSYCHOLOGY AND PSYCHOPATHOLOGY.

[91] A study of psychological types.—BEATRICE M. HINKLE. *Psychoanalytic Rev.*, 1922, ix, 107.

JUNG's well-known types which he termed 'introvert' and 'extravert' are here subdivided into four by the characterization of a greater subjectivity in one group and a greater objectivity in the other. In each of the subjective types is found something of the nature of both extravert and introvert, with an alternating centripetal and centrifugal movement of the libido, first one and then the other predominating. This produces an instability, as a true perception of the outer reality is difficult. The term 'subjective extravert' is used when the major movement of the libido is outward, and the term 'emotional introvert' when it is towards the ego. As the antitheses of these we have the objective extravert and introvert—six types in all. This long paper consists of a detailed dissection of these, with illustrated cases. The subjective represent the most complex

individualities, while the objective are the most simple. For therapeutic reasons it is important to distinguish these, so that we may realize where the greatest need for personality development lies. Confusion may arise because a reaction type may be assumed by an individual belonging to an opposite type, often through unconscious identification, which effort frequently breaks down.

In discussing the *simple extravert and introvert* it is pointed out that all normal persons possess in some degree the capacity for both these reactions, regardless of type. Though temporary withdrawal of the psyche from the external world is common, this rarely occurs in the extravert except in the face of some psychic blow or insurmountable obstacle, and then a definite effort at repression at once comes about. Spontaneous introversion in an extravert, therefore, must be looked on in a different light from the same state in an introvert. The introvert can withdraw quite independently of an external exciting cause, and in the face of a painful situation he broods over it without repression, until forced to action, so that finally he is freer in his adjustments than the extravert, who merely buries his pain. The extravert acts first and thinks afterwards; his feelings are his guide, and no special conscious effort at adaptation is needed. With the introvert, thought is paramount; action often uncertain and delayed; feelings out of touch with reality, with an intense self-awareness productive of a sense of inferiority; and a compensatory 'will to power', with frequently a dominant personality, are noted. In the former, the accent is on the object; in the latter on the ego or subject; but the introvert really overvalues the object and undervalues himself in relation to it.

In the *objective types*, practical utility is the measure of value. One type approaches life through sensation and the other through sensation and thought, while both turn wholly towards conquering the world without any feeling for the object, but only cold fact. In the psychology of nations the same type distinctions are found, and the authoress sees in England and Germany the characteristics of extraversion and introversion respectively. In the latter country the term 'Fatherland' is regarded as an over-determined masculine attitude.

When the *subjective types*, the emotional introvert and subjective extravert, are examined, we see a dualism in masculine and feminine characteristics, which outward behaviour may conceal, and also a dualism arising through the double movement of the libido, i.e., through the possession of both the subjective and objective worlds. Though one aspect of the personality may be emphasized, these individuals tend to alternate in moods and be unstable, so that a compensatory stubborn attitude may be assumed as a protection from the unbearable uncertainty. Danger of the eruption of irrational impulses from the unconscious is always present. Such persons, too, are very prone to identification, and this process is specially disturbing to the subjective extravert on account of his ego surrendering more or less to the feeling object, whereas the introvert never wholly loses his ego thus. The emotional introvert seems to have his feelings freed from thought domination, is quick and responsive, and by using his feelings almost exclusively for adaptation may superfi-

cially be mistaken for an over-emotional extravert type. Closer study, though, shows a greater tendency to extremes, with over-emphasis and insufficient discrimination. He is frequently undecided, attempts to adapt to reality through the four functions of intuition, sensation, thought, and feeling, and finds it necessary to adapt to two worlds, with the emphasis on the subjective. Such a person is therefore not so well adapted as the simple introvert to the external world. All subjective types have strongly developed intuition, which is often the most direct adaptive means; but in the introvert this is also inclined towards the inner world, and so is not a true guide to reality. The object is actually not seen so much as the ideal which appears to be the object. With the subjective extravert, who plays more with the object than that which he projects upon the object, it is just the reverse. No type presents such external differences as the emotional introvert, where all possibilities of combinations are present and all psychic elements are in an active state. They are the most difficult in human relations because of their mutually antagonistic impulses, and danger lies in the painfulness of their instability and the necessity for fixity. The compensatory drive may throw them violently into the objective world, render them very overbearing in their attempt towards masculinity, and tend to the prostitution of love and Don Juanism. Through narcissism a definite tendency towards homosexuality may be evinced.

Dr. Hinkle then discusses at some length her ideas regarding the definite unconscious symbols under which an individual makes his efforts at adaptation to the real world, which identification takes place often quite regardless of sex. The father symbol, the adult masculine symbol, stands foremost as the demand for reality and the dominant aggressive factor in phantasy, whereas the mother typifies love, understanding, and tenderness, from which altruism springs. The union of these two produce a third, the child symbol (daughter and son), standing for the imaginative, the irrational, dependency, and the unadapted aspect of the personality. Thus we have four symbols under which all humanity functions, which symbolize the actual aspects of the personality in its development; and through these four phases all humanity normally passes. The highest type of individual would be one in which all these components were fused into an integrated whole, a new being or true self, and it is here shown how, through various fixed identifications and reactions to these in the different types, special characteristics are engendered.

The *subjective extravert* has now to be considered. Here the libido is normally orientated towards the objective world, adaptation is made easier, and judgement is successfully guided by intuition. There is a marked tendency to identification, and from the complete surrender of the ego he often gains in development by the painful path of experience. He is often very emotional, and sporadically may have a feeling of inferiority determined by the depth of subjectivity. Their functions of imagination, feeling, and intuition lead such specially to prospective activities; but there may be weakness from too great surrender of self and a difficulty in holding themselves long enough to complete a task adequately. They are idealists and tend to be irrational and over-confident, but show less tendency to

homosexuality than the introvert. As samples of the subjective types in nations, France and the United States are taken as representative of the emotional introvert and subjective extravert respectively. A summary and general discussion of the types conclude this long but highly interesting contribution.

C. STANFORD READ.

- [92] Some applications of the inferiority complex to pluralistic behaviour.—LORINE PRUETTE. *Psycho-analytic Rev.*, 1922, ix, 28.

ADLER'S theory of inferiority with its compensatory strivings in the individual is regarded as important, and the manifold ways in which this affects the social group are pointed out. Primitive religiosity develops in this way through the invention of an all-powerful ally. Man craves completion: he wants to be perfect, and only his gods can make him so. In the religious crowd-phenomena of revivals there is a peculiar claim in offering compensatory prominence to an element usually disregarded in the community. The Christian religion shows a strong appeal to the feeling of inferiority and the accompanying desire for superiority. He who has been of no importance may attain supremacy by way of the martyr's crown, and the inferiority complex has obviously been an important factor in the adoption of foreign religion as in the East. Out of lowered esteem rises the struggle for self-assertion. Hence the presence of moral reformers and those who feel a tremendous responsibility for regulating the morals of the community. Security is sought from inferiority in a supporting network of prohibitions. Man has felt himself so inferior before the great current of sex affectivity that he has desperately sought any form of protection. The marriage vows were underwritten by the inferiority complex, and it is quite possible that this feeling will always prevent men and women from regarding themselves as secure without binding themselves to others and others to themselves. At the back of the labour movement there is a compensatory desperate craving for security, and the radical feminist movements are a protest against the inferiority complex of woman, who has for so many years been regarded as the weaker vessel. In the process of evolution, those animals not developing adequate compensatory characteristics lost out in the struggle for survival, and the new brain which changed the shape of man's forehead may be said to have developed as the compensation for his inferior physique. From this standpoint education must be considered as but the process of discovering suitable compensation for each individual.

C. STANFORD READ.

PSYCHONEUROSES AND PSYCHOSES.

- [93] The causes and treatment of juvenile delinquency.—CYRIL BURT. *Psyche*, 1922, iii, 56. (*Concluded.*)

In the majority of the cases analyzed the motives show mechanisms of the type with which recent psycho-analytic study has familiarized psychologists in mental disorders of a different type—hysteria, the neuroses, and the psychopathology of everyday life.

Burt's analyses agree with those of Healy, and of the few continental

psycho-analysts who have dealt with the problem of delinquency, in emphasizing the importance of repression and sexual complexes. His results, however, give to the nature of the sexual factors at work a far wider interpretation than is usually accorded. He lays greater stress upon the after-effects of the Oedipus complex, particularly of the hate aspects of this complex, which seem far stronger in the delinquent than in the morally normal or the merely neurotic. He considers that the anal complexes play an important part in reinforcing the sadistic or hate aspects, particularly in the case of boys: and in the case of girls lays stress upon step-parent fantasies. In both sexes the auto-erotic and narcissistic components appear to play a large part. The specific instincts may be either permanently fixed or else modified and extended by habit formation. Accompanying pleasure tends to stamp in a tendency to delinquency: pain hammers it out.

Much crime and delinquency is symbolic. The theft of unwanted articles is significant because the articles possess an unconscious and emblematic value. The mental processes involved in symbolic theft are more fantastical than those involved in the symbolism of everyday life. The clearest examples are those of fetishistic stealing.

The primitive emotions of the child are connected with the sentiments for its parents: later the child evolves similar sentiments for others. In delinquent children the absence of desirable interests is more marked than the presence of undesirable interests. The reforming psychologist should endeavour to harness the child's pleasurable interests to some external object.

Sentiments of antagonism are occasionally responsible for theft from the object of the child's enmity. The ambivalency of the sentiments of love and hate is the potent factor in the developing child. Delinquency bears a very important relationship to parental influence, and, in stealing, the child may be unconsciously searching for some parental substitute. Repression of the knowledge of sexual temptation is often a real provocative. This may result in crime or behaviour of an irrelevant nature, resulting in substitutional delinquency, acting as a counterblast for what the child considers the greater sin. Stealing may thus symbolize a sexual act, and running away flight from an unpleasant problem. The repression of early sexual ideas or actual transactions are thus frequently responsible for the convulsive misconduct which gives temporary respite. Sex conflicts appear to be commoner in better-class homes. Repression of self-assertion is important in younger children, this instinct having been ruthlessly crushed from the child's earliest days. From this adult suppression an 'inferiority complex' may result, and if it should be aggravated by a physical defect or deformity, the victim will frequently make up for it with illicit compensations. These complexes are brought to a critical stage at puberty, and the effects are often most disastrous.

In treatment the one essential is a full investigation upon quasi-psycho-analytical lines. Owing to the parents' own complexes, remedial methods should accompany a temporary removal from the home.

In summarizing, the author emphasizes the importance of the need

for an intensive study of each individual offender. There is, for juvenile delinquency, no one cause and no one cure. To fine, flog, or send the child to an industrial school is an acknowledgement of failure, not a measure of reform. The author's view is that a wider and more scientific employment of the system of probation would largely meet the need. If segregation be necessary as a last resort, the normal and defective should not be herded together. Cases should be more finely classified, and institutions should be specialized for particular types. In these institutions, treatment should be undertaken as well as punishment bestowed.

ROBERT M. RIGGALL.

- [94] **Environment as it influences the development of the juvenile delinquent.**—PERCY L. DODGE. *Amer. Jour. Psychiat.*, 1922, i, 629.

At the Boston Psychopathic Hospital 58 cases of conduct disorder were considered; 42 were girls, 16 were boys. The large percentage of girls is accounted for by the fact that most of them are sex offenders. Of the 42 girls, 12 were up to normal mental intelligence, 2 were above normal intelligence 1 to 5 years, 25 were below normal intelligence 1 to 5 years. Of these 42 girls, 25 developed the same delinquencies as were present in the home; 17 developed different delinquencies from those actually present in the home, but the neighbourhood easily afforded the stimulation and development of such delinquencies. They received little instruction or proper bringing up, and were allowed to go out in the neighbourhood where influences were bad. Many of these 17 had drunkards for parents, some had to work like slaves and were finally driven from home to search for freedom, only falling into worse conditions at the hands of some persons who for the moment appeared kind to them. Of the 16 boys, 13 developed the same delinquencies, lying, stealing, trancies, etc., while 3 developed other delinquencies, because of poor supervision and the fact that they associated with bad gangs in the neighbourhood. Of these boys, 1 is eight years retarded, 2 are five years retarded, and 1 is four years retarded. The various types are illustrated by brief case histories.

C. S. B.

- [95] **Conversion epilepsy.** EDWARD H. REEDE. *Psycho-analytic Rev.*, 1922, ix, 28.

The author herein describes a convulsive condition which resembled idiopathic epilepsy, so that for fifteen years it had been treated on orthodox lines without success, but which he relieved by analytic procedure in the course of six months. Freedom from convulsion during a succeeding two years resulted, with insight into the mechanisms involved, and more or less future normal adjustment. The fundamental fact in epilepsy is a defect in consciousness. Such unconsciousness is a very successful flight from reality which demonstrates a serious lack of capacity for adaptation. The particular reason in each individual case is exquisitely personal. Reality is fled from because it is pain-producing.

The patient, a woman, age 33, had at the age of 7 a period of great emotional stress with conduct of the anxiety type, and at 13 evinced

petit mal and minor convulsions, culminating in typical grand mal at 16. The repressed emotion was the result of that form of fear reaction of the organism known as shame, and the primary determinative instinct was the pleasure motive of infantile sexual desire. There was never any evidence that the convulsion served as the surrogate for sex satisfaction, but seemed a symbol of shame. The first psychic trauma discovered was a heterosexual act at the age of 7, which, owing to the excessive anxiety of the mother, and the father's sternness in reproof, initiated the reaction of shame with its natural ambivalency. Night terrors appeared, with profound shame on awakening. She was found indulging in some homosexual play at the age of 9, when she was told she "was worse than a dog", and severely chastised by her father. A phobia of mad dogs later developed, and she became a very timid, shrinking, sensitive child, with a tendency to religiosity. Evil thoughts were rated as sins and added to her repressions. When 12 years old, without knowledge of its meaning, she used the word 'hermaphrodite' in her mother's presence, and the disgrace she met with seems to have motivated some spasm of the lips and vocal cords, which appeared at 13 as the first minor convulsion when called on to recite at school. Menstruation appeared at this time, and became linked up with the previous mental conflicts. The spasms seem to have been avertive muscular efforts to conceal shame. Six months later she had a spasm of the arms, and after a gynecological examination because of dysmenorrhoea at the age of 16, the determining moment arrived for the flight from reality, when a complete general convulsion with loss of consciousness took place. This unconscious action pattern is perceived by consciousness as the symbolic conviction of despair.

Therapy consisted, firstly, in helping consciousness to wear the cross of shame with stoutness of heart in the midst of things as they are; secondly, in extending consciousness to the horizon of the shameful childhood memories; thirdly, in the patient understanding the disguised symbols of the childhood dramas as they existed later; and, fourthly, in extending the conscious control of the future.

C. STANFORD READ.

[96] **Epilepsy in the offspring of epileptics.**—D. A. THOM and G. S. WALKER. *Amer. Jour. Psychiat.*, 1922, i, 613.

THE authors are naturally convinced that epilepsy is by no means entitled to the classification of a disease entity, and note that the syndrome which goes to make up the condition is neither constant nor characteristic. They have noted that the so-called epileptic personality is frequently not present and is often found associated with other deteriorating diseases. Nor is epileptic dementia always a sequel to convulsive disorders, which are frequently found to have as the etiological factor some experience to which excess of emotion is attached. In 117 cases a study was made of the parents and of the offspring, from which the following conclusions were reached :—

1. Epilepsy as a disease is not transmitted directly from parent to offspring, but rather is it an unstable nervous system that is inherited.

The manifestations of this instability may be mental deficiency of all degrees, insanity of various types, neurological or psychopathic disorders, or convulsions from various exciting causes.

2. These mental and nervous disorders are less frequently found in the offspring of the so-called epileptic than hitherto believed, and the future of the offspring of epileptic parents is not as hopeless as recorded.

3. Maternal defects are more frequently manifested in the offspring than are the paternal defects, and when present are more likely to appear at an earlier age.

4. In only a few cases 'pure cultures of epilepsy' were dealt with. In most cases contamination was brought about by some defect in the other partner, such as feeble-mindedness, insanity, alcohol, and syphilis.

5. Convulsive disorders were more frequently found in the offspring of the organic group as compared with the idiopathic group.

6. There is a necessity for research relative to the transmissibility of genetic effects in both epilepsy and psychiatry. The dogmatism regarding this aspect of mental diseases has not been justified.

C. S. R.

[97] **Emotional and illegal acts in connection with schizophrenia.—**

JOHN RATHBONE OLIVER. *Amer. Jour. Psychiat.*, 1922, i, 589.

From his medico-legal experience the author thinks that certain types of emotional states in the non-insane can be most easily explained by postulating a disturbance of hormone equilibrium, and suggests that the affective imbalance shown in schizophrenia may be due to the same factor. The outstanding symptoms of the stressful emotional conditions in which illegal acts may be committed (a case of murder being quoted at some length) are: (1) A more or less retrograde amnesia associated with loss of restraint and realization of consequences; (2) An imperviousness to external stimuli; (3) Each emotional state of this type results in a constantly increasing ease, and violence of further reactions (summation of stimuli); (4) Excessive physical exertion is shown without apparent fatigue; (5) Mental and physical exhaustion following such states.

In schizophrenic cases attention is drawn to the indifference to emotional stimuli; the lack of unity and sluggishness in the expression of emotional reactions and their changeableness without adequate external cause; the lack of regularity in the appearance of emotional reactions and their distortion and ambivalency. When these schizophrenic findings are compared with the non-schizophrenic emotional states (presumed to be due to disturbed endocrine balance), we see that in both types of cases there is some definite disorganization in the whole system of emotional reactions; but in the former the hormone disturbance is more or less permanent and involves deterioration. In both types of cases also the most fundamental traits of personality are attacked. In schizophrenia, however, there is postulated as well some organic destructive changes, some actual atrophy in one or more of the endocrine entities. To confirm the conception of the genesis of schizophrenia from the standpoint of a polyglandular disorder, additional suggestive facts are summarized—loss of

weight in such cases: disturbances in their involuntary nervous system; abnormal pharmacological reactions (atropine, pilocarpine, adrenalin); retarded coagulation of the blood; and the Abderhalden test, though of doubtful value. Though the writer is not seemingly dubious concerning his theory, he confesses that it has not helped in the treatment of schizophrenia to any noticeable extent.

C. S. R

[98] **Constructive formulations of schizophrenia.** ADOLF MEYER. *Amer. Jour. Psychiat.*, 1922, i, 355.

AMONG the conditions that are suggestively covered by the term schizophrenic reactions there are enough instances of recovery to make it desirable to avoid the term 'dementia praecox'. In the author's country psychiatrists have been tending to let classification adapt itself to the facts, instead of the reverse. We see recoverable manic-depressive attacks, and others in whom the condition becomes chronic with a definite dementia-praecox picture, clearly suggesting transition forms. Better observation might have led to anticipation of what happened. Mental disorders cannot profitably be studied with an excessive emphasis on a prognostic classification according to outcome. The principle through which deterioration is produced is still uncertain, and not even the histological side is safe. The best facts are the data of observation and mentation, and we must work from the start with the *dynamic* as well as with the descriptive data. It should not be so much a question, Is the case one of dementia praecox or manic-depressive insanity? as, What are the reaction groups and the factors at work? What is the group tendency of the reactions and the individual prognosis?

Meyer, speaking in terms of ergasia or behaviour, determines first the existence of anergastic or dysergastic disorders: amnesic disorders and defects states constituting the anergastic (organic) data standing for a lasting structural deficit, and the delirious-toxic reaction type illustrating the usual transitory dysergastic changes. The more clearly *functional* disorders are reviewed from the angle of mere *part-disorders* (dysmnestic hysterical reactions, obsessions, anxiety states, hypochondriasis), and the *more sweeping disorders*, looking first for the *affective* involvement and the *content* disorders without or with evidence of *substitutive reactions*, *symbolizations*, *dissociations*, and *distortions*. The compatibility of the affect with the content disorder is important. The closer we come towards autistic thinking, projection, and the more or less leading hallucinations *without* adequate excuse by affect or without dysergastic (i.e. delirium-like, usually toxic) disorder of the sensorium, the more likely do we deal with *schizophrenic reaction*. The greater the incongruity of affect and content and the consequent distortion, the more ominous the condition. The making of a prognosis depends upon the formulation of all the factors at work, the reactions present, and the response to one's efforts at readjustment. The prognostic issues in schizophrenia depend undoubtedly on the severity and aggressiveness of the incongruous tendencies and on the aptitude of the *balancing* resources to assert themselves inwardly and outwardly, and on the seriousness of any metabolic deficit. The more we deal

with a serious endogenous involvement of the metabolic and visceral functions and oddities of the psychobiological processes, the more profound is the process likely to be.

Meyer would like to abandon the prognostic factor as a nosological criterion, to replace the term 'manic-depressive' psychosis by *affective reaction group*, and replace the term dementia praecox by schizophrenia for the full-fledged forms, besides recognizing transition forms.

C. STANFORD READ.

[99] **Reversible schizophrenia. A study of the implications of delirium schizophrenoides and other post-influenzal syndromes.**

KARL A. MENNINGER. *Amer. Jour. Psychiat.*, 1922, i, 573.

IGNORANCE of the real nature of delirium is pointed out, but it has many points of contrast with dementia praecox. French psychiatrists have drawn attention to an infective toxæmic etiology of schizophrenia, but there has been a tendency to call certain syndromes, which really are schizophrenic in nature, amnesia, confusional insanity, acute hallucinatory confusion, etc. Menninger thinks he is justified in recognizing three types of dementia praecox based on the prognosis—one with ultimate and irrevocable dementia; another with attacks which are often recovered from, but which recur sooner or later; and a third, ending apparently in a complete and permanent recovery. The usual differentiation into hebephrenic, catatonic, and paranoid is regarded as useless, and the process known as reversibility is of much more pragmatic import. Cases of psychoses associated with influenza are advantageous in the study of schizophrenia with particular regard to its reversibility and its relation to delirium, as influenza can apparently in some mysterious way so affect the brain that a transient or permanent syndrome of dementia praecox may unmistakably appear. A simple delirium may come on with the somatic illness or directly after it. This may persist and develop more and more into the picture of a chronic dementia praecox with its usual poor prognosis (schizophrenia deliriosa), or a psychosis may arise in close association with the illness, so coloured by schizophrenic reactions that a pessimistic prognosis is given which is belied by its eventual disappearance (delirium schizophrenoides). It is maintained that these two forms are not essentially different, and that between the mildest attack of simple delirium and the most profound dementia of late schizophrenia there is a progressive gradation, not in the intensity of schizophrenic symptoms present (as these are variable products of little prognostic significance), but in the degree of reversibility (i.e., the potentiality for recovery). Dementia is viewed by this author as at least in most instances a somato-psychosis, as the psychic manifestations of an encephalitis. The benign or malignant character of this encephalitis perhaps determines the degree of reversibility of the mental disease. Diagnosis is chiefly useful for prognosis. Prognosis depends on reversibility. It remains, then, to determine the conditions of reversibility. Cases illustrating the above points are given.

C. STANFORD READ.

Reviews and Notices of Books.

Insanity and Mental Deficiency in Relation to Legal Responsibility.

By WILLIAM G. H. COOK, LL.D., Barrister-at-Law. Demy 8vo.
Pp. xxiv + 192. 1921. London: George Routledge & Sons Ltd.
10s. 6d.

DR. COOK is a barrister-at-law who, as a former official of the Asylums Department of the London County Council, came into contact a good deal with the legal and administrative side of lunacy. He is therefore peculiarly qualified by education and experience to deal with the important subject of insanity and mental deficiency in relation to legal responsibility. The production of this book has involved a close study of over 200 reported cases. Most of the matters dealt with are treated historically, and the bearing of the corresponding sections of the penal codes of foreign countries discussed. It is remarkable how Dr. Cook has managed, in a work of such modest dimensions, to treat his subject so comprehensively. He is concise, clear, and readily followed by the non-legal reader, and his brevity and condensation are not obtrusive.

Broadly speaking, Dr. Cook, while showing that the law as regards the responsibility of the insane for criminal acts has been defined as recently as 1892, points out that the law relating to the civil responsibility of lunatics is still without precision and has not yet been placed on a satisfactory footing. In developing his theme he supplies medico-legal information of great practical value to every practising physician and lawyer, and especially to the alienist.

Chapter I, on "Definition and Classification", should be read in conjunction with Chapter VII, on "Evidence of Insanity". It is to be regretted that they are so widely separated, for alone Chapter I lends itself to much adverse criticism, and the medical reader might be discouraged from proceeding further. However, the discussion on "Evidence of Insanity" at once corrects this impression, so much so that one is tempted to suggest that this last chapter should be first, and the first last. Dr. Cook of necessity brings a legal mind to bear on his subject, and such criticisms as might be made, if space permitted, would be apropos of the legal attitude in general to the subject of mental disease and defect, and not of the admirable way in which it is conveyed in the work before us.

Chapter II deals exhaustively with mental deficiency in relation to tort. The view taken is that "the common law of England regards a lunatic as being incapable of committing a tort, but that, where it can be shown to the satisfaction of the court that the particular nature of the insanity did not preclude him from understanding the nature and probable

consequences of the particular act complained of, he will be liable for his torts, just as an ordinary person is liable, i.e., on the ground that he intended the natural and probable consequence of his acts".

Chapter III treats of the law of contract, and in succeeding chapters mental deficiency and marriage, insanity and divorce, and testamentary capacity in mental deficiency are all dealt with, and are of absorbing interest. In fact the book generally supplies a want the public, and medical men especially, have perhaps unconsciously needed, for after perusing its pages one feels the necessity of always having it at hand.

There are two appendices: (I) a summary of the chief powers and duties of lunacy and mental deficiency authorities in England—very useful for reference, and (II) suggestions for the reform of lunacy and mental deficiency administration—which is foreign to a book of this nature and is best unread or, if read, quickly forgotten. One would have thought that the general experience of national bureaucracies during the war and even before, and their deadening influence and costliness, would have deterred any one from advancing seriously a proposition which would make the care and treatment of the indigent mentally afflicted a national charge and abolish all local responsibility for carrying out the provisions of the Lunacy Act. Central control of the science and art of medicine would soon strangle all initiative and retard progress. However, this is a side issue, and does not detract from the value of the book or the real ability of the author.

J. R. LORD.

Suggestion and Mental Analysis: an Outline of the Theory and Practice of Mind Cure. By WILLIAM BROWN, M.A., M.D., Wilde Reader in Mental Philosophy in the University of Oxford. Crown 8vo. Pp. 165. 1922. London: University of London Press. 3s. 6d. net.

THE author states that he has set out to correlate the therapeutic methods of suggestion and analysis, also to review the claims recently put forward by M. Coné. A simple explanation is given of suggestion and the essential principles of psycho-analysis. The author gives his own theory of dreams, which is that they are the expression of a compromise between the 'instinct of sleep' and other conations both conscious and unconscious. He states that "sleep is an instinct like pugnacity, etc.", but he does not tell us on what grounds he has arrived at this somewhat novel conclusion. He criticizes the Freudian transference by transposing the Freudian thesis that suggestion is merely a form of transference, holding rather that transference is merely a form of suggestion.

A case is described illustrating hysteria as a dissociation, and hypnosis is discussed, in which connection the author expresses himself in agreement with the teaching of Charcot rather than that of the Nancy school. Neurasthenia and compulsive neuroses are described and the use of auto-genosis in their treatment. Hypnosis and suggestion are dealt with at greater length; the view is upheld that no person who is completely normal can be hypnotized, and the degree to which hypnosis is possible is a measure of his abnormality. The author regards hypnosis as a dissociation, and therefore not the same thing as suggestion, and not an advisable form of

therapy except for reviving dissociated memories for the purpose of re-associating them. He discusses and criticizes Coué's theory, especially the so-called law of reversed effort, pointing out that what Coué calls 'will' is not will at all, but a spasmodic conflict between a suggestion and its opposite. With the practice he finds himself in agreement, but points out that autosuggestion can hardly be started except by heterosuggestion and that some sort of autognosis is necessary. The last three chapters are devoted to an exposition of Bergsonian philosophy, but it is not explained how the author's psychological and therapeutic teaching are connected with this system. Why, then, this philosophical digression, which is somewhat inadequate and therefore hard to follow? Apart from this, the book is simple in its wording, and should at any rate serve to stimulate those interested in the subject to read more widely, but one would have liked to see a psychologist of the reputation and standing of Dr. William Brown making it more clear that many of his assertions are of the nature of concepts and policies rather than phenomena.

R. G. GORDON.

Outwitting our Nerves. A Primer of Psychotherapy. By JOSEPHINE JACKSON, M.D., and HELEN M. SALISBURY. Crown 8vo. Pp. 403. 1922. London: Kegan Paul, Trench, Trübner & Co. Ltd. 7s. 6d. net.

As a popular but up-to-date exposition on 'nerves' and all that that term embraces, nothing but praise can be accorded to the authoresses. Within these pages Freudian principles and their practical applications are dealt with in a homely way which should appeal to a wide section of the community. When it is so essential that society should be educated towards a truer understanding of what 'nerves' and a 'nervous breakdown' really mean, it is highly gratifying to find that the reader is at once told that there is nothing the matter with a person's nerves, that a "nervous disorder is not a physical but a psychic disease. It is caused not by lack of energy, but by misdirected energy, not by overwork or nerve depletion, but by misconception, emotional conflict, repressed instincts, and buried memories". Such a veridical statement cannot be sufficiently impressed upon the mind of the laity and also upon the medical profession, in view of the fact that even at the present day there is a tendency to regard every possible abnormal mental symptom, including even the writing of libellous postcards, as due to some hypothetical nervous exhaustion. No progress in mental medicine can adequately take place until such a fallacy is invalidated. In a plain but interesting manner the story of the instincts, the subconscious mind, and the relations of mind and body are tellingly presented, thus leading up logically to the why and wherefore of the development of symptoms and the rational psychotherapy for their removal. Suggestion, persuasion, and psycho-analysis as methods of treatment are discussed and given their true value, and it is logically pointed out how in the majority of instances the principles involved in the last-named have to be applied in order to reach the *fons et origo* of the disorder.

There are, however, some adverse criticisms to be made. It is curious, after showing that 'nerves' are really mental in origin, that the statement

should be made (page 13). "but insanity is a physical disease, implying changes or toxins in the brain cells". In the great majority of cases no such implication has a right to be made in the face of modern knowledge, and such theories have mainly resulted from ignorance and materialistic speculation. Too much stress in many parts is laid upon the effects of suggestion and autosuggestion, the latter especially being a conception of very doubtful scientific validity, and in the glossary some terms are poorly or inaccurately described. In dealing with the mental element in organic malfunctioning, we think that a belittling of possible somatic factors is too much in evidence, and this exaggerated standpoint is harmful. Nevertheless, in its entirety the authoresses show that they have read widely, and from both the theoretical and practical sides have produced a very acceptable and readable book. In the hands of a tyro in such matters it should prove of great value, not only in correcting misconceptions on 'nervous disorders', but in further stimulating study of the hidden workings of the self. A short bibliography is given with this aim in view.

C. STANFORD READ.

The Care of the Adolescent Girl: A Book for Teachers, Parents, and Guardians. By PHYLLIS BLANCHARD, Ph.D., with Prefaces by Dr. MARY SCHARLIEB and Professor STANLEY HALL. Pp. xxi + 201. 1921. London: Kegan Paul, Trench, Trübner & Co. 7s. 6d. net.

This is not a book that can be recommended without reserve. Its author, impressed by the upheaval of the great war which has "brought to woman new duties and grave responsibilities", aims at giving advice to teachers, parents, and guardians to enable them to provide young girls with "information concerning their own natures". In the main the chapters deal with the love and sexual life of the female adolescent; but a strange medley of extraneous topics is included—for example, philosophic views of love from Empedocles to Schopenhauer, 'will to power', illegitimacy, Jung's theory of dementia precox, the raping of conquered women, etc. As a result, the ground covered is too extensive to be dealt with in any but a superficial way. Further much space which might have been allotted to more pertinent material is filled with florid and trite rhetoric. "We need the love that renews and replenishes its energies in the love of its mate, to turn its forces outward again in ever-widening social and racial expressions. For this is the love that is eternal, the love that brings to its possessor the joy of fulfilment that is beyond all expectation"; and so on. Without doubt there is a truth enshrined in this; but surely when the author wrote it and many similar passages she failed to keep in mind the average parent or guardian confronted by the average adolescent girl (i.e., flapper) of to-day. Or is it thus we teach young girls to understand their natures? Moreover, Dr. Blanchard has as facile a command of up-to-date psychological terms and phrases as any American journalist who is specializing in 'moral uplift', and she talks psycho-analysis as though to the manner born; but that her acquaintance with this subject goes very deep the present volume sheweth not. She seems to have read a good deal, but if all her reading had been assimilated she could hardly have

formed the expectation, still less expressed the earnest hope, that her book will enable young girls to analyze themselves.

These faults apart, however, the pages contain a good deal of reliable information which should be common knowledge in every household and school, and the author's presentation of it has a value in so far as it may bring helpful truths before those many readers who like facts and sentiment mixed. This is all to the good. Nevertheless, we would submit the following two considerations. When it is a matter of 'understanding' anything about ourselves, adolescents and children alike learn more, and with greater advantage, when the plain facts are put straightforwardly before them. Second, just as no physiologist would think of ornamenting his description of a physiological process with rhapsodical embellishments, so the psychologist must be content to accept a no less prosaic standard in his own books. To do otherwise is to confound science with sentiment, and to muddle the understanding by emotional obscurities. Dr. Blanchard has intelligence, and she is obviously moved by a warm sympathy for young girls; this should enable her in a future book to be of greater practical use to those whom she wishes to serve and who sorely need the instruction which she might give.

D. F.

Hints to Probationer Nurses in Mental Hospitals: with a Brief Introduction to Psychology. By RICHARD EAGER, O.B.E., M.D. (Aberd.), Medical Superintendent, Devon Mental Hospital. Demy 16mo. Pp. 80. 1922. London: H. K. Lewis & Co. 1s. 6d. net.

THIS small volume is intended as a help to those starting attendant duties in mental wards who have had no previous training in such work and who await systematic lectures. Useful general rules are laid down, ward duties are very briefly sketched out, and needful action in emergencies dealt with. The latter half is devoted to an endeavour to give the probationer some idea of normal and abnormal psychology in outline. Thus consciousness, the unconscious, perception, association, instincts, emotion, volition, illusions, hallucinations, 'conflict' and 'complex', rationalization, repression, projection, dissociation, delusions, dreams, and symbolism are dealt with in turn.

Though we consider it a very laudable attempt on the part of Dr. Eager thus to train probationers and give them some insight into psychological conceptions, it is more than doubtful if even a few of such readers would be able to gain any useful grasp of the subject even in a most elementary way from the perusal of his book. Psychology presents unusual difficulties in this respect to those who have not had an adequate education, and especially is this so in reference to such conceptions as complex, rationalization, dissociation, and symbolism. The more intelligent mental hospital attendant will at any rate be stimulated hereby to take an added interest in those under his care, and may by subsequent lectures gain a really useful though slight understanding of the mental mechanisms underlying the symptoms he observes. With the above reservations, only good can accrue from the circulation of these 'hints', which doubtless will be favourably received in mental institutions.

C. STANFORD READ.

Juvenile Delinquency. By H. H. GODDARD, Ohio Bureau of Juvenile Research. Small 8vo. Pp. 120. 1922. London: Kegan Paul, Trench, Trübner & Co., Ltd. 3s. 6d. net.

AFTER a brief discussion of the problem of delinquency and of the great changes which have taken place in recent years regarding our knowledge of the psychological factors involved, and, in consequence, the methods of treating delinquents, the author passes on to what is perhaps the main purpose of this small volume, namely, an account of the Ohio Bureau of Juvenile Research, of which he is the director. The details given are too meagre to be of any practical value to the psychologist or psychiatrist, and this fact, together with its rather popular style, suggests that the book is primarily intended for the layman rather than the physician. The purpose of the bureau is to make a psychological examination, and give advice, and where possible treatment, in cases presenting abnormality of conduct, and in the cases admitted this varied from 'unmanageable' to murder. A considerable proportion of the cases are referred from the courts, but others are brought voluntarily by parents. The total number examined in the institution during a period of two years was 3578, ranging in age from four months to nineteen years. Of this number it may be stated that roughly about one-third were mentally defective, another third were psychopathic, about 17 per cent were of deferred development, 8 per cent syphilitic, whilst less than 5 per cent could be regarded as normal. Although Dr. Goddard's final words are, "juvenile delinquency can be largely eradicated", and although there can be no doubt, as he points out, that better methods of education and upbringing would materially contribute towards this result, yet it is quite clear, as the author recognizes, that this cannot be the case with a very large proportion of the mentally defective and psychopathic, for whom the only solution is permanent care in an institution.

A. F. TREDGOLD.

Fundamental Conceptions of Psycho-analysis. By A. A. BRILL, M.D., Lecturer on Psycho-analysis and Abnormal Psychology, New York University. Medium 8vo. Pp. 344+v. 1922. London: George Allen & Unwin, Ltd. 12s. 6d. net.

THE contents of this book are taken from lectures given at an elementary course at the New York University Department of Pedagogics, and are therefore not very technical, but give a more or less superficial survey of Freudian principles. Dr. Brill, from his large practical experience, however, gives the reader many observations and deductions of his own. After a brief history of the scientific origin of psycho-analysis, which leads to the exposition of the nature and function of the neurotic symptom, chapters follow on the psychology of forgetting, the psychopathology of everyday life, the technique of wit, the function and motive of the dream, types of dream, common forms of insanity, the only child, fairy tales, and, lastly, the selection of vocations. Nothing novel is found in the author's treatment of the subject, but we have a very comprehensive and readable presentation of psycho-analytic doctrines with their practical applications. We

think it would have been better had the common forms of insanity not been dealt with in such a volume. Their clinical description with details which can mean but little to the laity seems somewhat out of place here, though if touched upon in a broader way some useful purpose might have been served. Where there is such an opportunity of enlightening the public on a subject of such vital importance, it is a pity that Dr. Brill should be so misleading and even inaccurate as to say (page 27) that a neurosis (including a psychoneurosis) is a nervous disease or a nervous disturbance, in contradistinction to a psychosis, which is a mental disorder. Surely a psychoneurosis is just as much mental, and may be more so, and it is essential that such euphemisms as 'nervous breakdown' should no longer be used. It is also questionable whether the lay reader should be told (page 49) that a patient who is trying hard to talk but cannot is suffering from mental retardation; and also that "we can tell at once that the patient who suffers of this mental retardation, and has nothing organically wrong with him, will recover". Experienced psychiatrists know that no such lightning diagnoses and prognoses can be made, and it is a pity that in a popular book such statements should be made, though Dr. Brill probably does not mean what he seems to convey. These criticisms, however, do not detract in any appreciable degree from a book which amply fulfils its purpose, and since it is written by such an authority, it can be cordially recommended to the general reader.

C. STANFORD READ.

Mind and its Disorders: a Text-book for Students and Practitioners. By W. H. B. STODDART, M.D., F.R.C.P., Examiner in Psychology and Mental Diseases to the University of London. Fourth edition. Demy 8vo. Pp. xvi + 594. 1921. London: H. K. Lewis & Co., Ltd. 22s. 6d. net.

THE third edition of Dr. Stoddart's text-book differed radically from its predecessors in that the author announced therein his acceptance of the theory of psycho-analysis, and boldly endeavoured to incorporate this new point of view with the more conventional treatment of the subject contained in the earlier editions. Dr. Stoddart was himself keenly aware of the difficulties of this task, and had hoped in a future edition to make radical changes in the whole scheme of the book. Owing to the speedy demand for a new issue, however, he has not been able to carry out his intention, and the present fourth edition, although it has been revised and contains a certain amount of new matter, is in all essential respects similar to its predecessor.

Introductory Lectures on Psycho-analysis. By PROFESSOR SIGMUND FREUD, M.D., LL.D. Authorized translation by JOAN RIVIERE. With a Preface by ERNEST JONES, M.D. Demy 8vo. Pp. 388. 1922. London: George Allen & Unwin Ltd. 18s. net.

A PREVIOUS translation of these lectures was reviewed in Vol. I, No. 3, of this journal. Therein, however, there were many serious errors in translation which greatly militated against its value. Dr. Ernest Jones' assurance that this present volume is a faithful rendering of the original

text is of course authoritative, so that we have no hesitation in stating that this work constitutes an ideal introduction to the study of psycho-analysis. In the latter part of the contents, more especially in dealing with the problems of narcissism, Freud has expressed some of his more recent ideas, so that those who are to some extent conversant with psycho-analysis will learn much, not only from the wonderful lucidity of the general exposition, but also from the fresh subject matter. The book, therefore, cannot be too highly recommended.

C. STANFORD READ.

Penal Discipline. By MARY GORDON, LL.R.C.P., LL.R.C.S. Edin., Late H.M. Inspector of Prisons. Pp. xiii + 238, illustrated. 1922. London: George Routledge & Sons Ltd. 7s. 6d. net.

THE authoress deals humanistically with criminal offenders, and from her official experience gives her views on the present prison system. She sees in this system a social curiosity and much retaliation on the part of society which has no deterrent effect, but only conduces to further anti-social conduct through penal discipline. A plea is made for the application of the findings of science in which the criminal shall be dealt with more as an individual and from a more rational standpoint. It is evident that the writer's enthusiasm has been stimulated by modern psychological study, and, in her dissection of the types of offenders she speaks of, the various factors making for maladaptation are pointed out. In the chapter on "Psychical Considerations" she superficially deals with the emotional effects of penal discipline, how phantasy life is enhanced, and the abnormal mental results of a hysterical or psychotic nature which may thereby ensue. In conclusion the bases of reform are sketched out. The book is written rationally, without any sentimental exaggerations, and can be commended as a simple exposition of an important social problem concerning which stimulation to action is certainly needed.

C. STANFORD READ.

Psycho-analysis: its Theories and Practical Application. By A. A. BRILL, Ph.B., M.D., Lecturer on Psycho-analysis and Abnormal Psychology, New York University. Third edition. Large 8vo. Pp. 468. 1922. Philadelphia and London: W. B. Saunders Company. 24s. net.

THE third edition of this well-known work, which originally appeared in 1912, has been thoroughly revised. Certain chapters have been amplified by the addition of further illustrative material, and a new chapter has been added entitled "Studies in Paraphrenia". The cases described therein are mild psychotic disturbances which, although by no means typical examples of Kraepelin's dementia praecox or paraphrenia, are clearly allied thereto. The diagnosis of these conditions from the psychoneuroses is discussed, and its importance emphasized in view of the fact that 'mentally sclerotic' patients of this type cannot be benefited by psycho-analytic treatment.

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Original Papers.

EPILEPSY AND GUNSHOT WOUNDS OF THE HEAD.

By WILLIAM ALDREN TURNER, LONDON.

SUFFICIENT time has elapsed since the termination of hostilities to reveal the later effects of gunshot wounds of the head. Of these sequelæ epilepsy is one of the more important. The figures, so far available from the records of the Ministry of Pensions, show that only a small percentage of those who have received such injuries have developed epileptic attacks—out of 18,000 cases of gunshot wound of the head, 800, or rather less than 5 per cent, have become epileptic (Sargent¹).

In the absence of particulars of the nature of the head injury it is difficult to say whether these figures refer to all varieties of gunshot wound of the head, or only to those of a serious nature in which the skull has been penetrated. They may, however, be compared with some given by Allen,² who mentions that of 167 cases of injury of the skull received in the American Civil War, 23, or 13·7 per cent, were on the Pensions list as suffering from epilepsy.

In the Franco-Prussian War of 1870 there were 571 cases of recovery from gunshot wounds of the skull; of these, 25, or 4·3 per cent, developed epilepsy—a figure remarkably similar to that from our own Pensions list.

Holmes and Sargent³ investigated the effects of gunshot wound of the head in 610 cases between two and eighteen months after the infliction of the wound. They eliminated all cases of scalp wound, and others in whom the nature of the wound was uncertain. On this

basis they found that 37 cases, or 6 per cent, were suffering from fits, but whether Jacksonian or generalized epilepsy there was no means of knowing. Their conclusion was that epilepsy following gunshot wound of the head was much less common than had been foretold.

On the other hand, Rawling,¹ who collected 452 cases of all varieties of gunshot wound of the head—scalp, penetrating, non-penetrating, and perforating wounds and fractured base—reports that 25 per cent of these developed 'fits' as a remote effect of the head injury. In his series, the generalized fit was more common than the Jacksonian type of seizure, and the cases were observed at a considerably longer period after the wound than those of Holmes and Sargent.

From these figures it would appear as if the frequency of traumatic epilepsy following gunshot wound of the head varied to a large extent with the interval which had elapsed between the infliction of the wound and the date of examination, as well as upon the nature and severity of the wound itself.

From my own observations upon officers who had received penetrating wounds of the head, and who were seen at an Appeal Board for the assessment of their disability, a third condition of variability might be added, viz., the recognition of minor or 'petit mal' fits and epileptic equivalent attacks of a vertiginous character. These are readily overlooked, and may not be referred to by the patient unless inquiry is made into their occurrence. I therefore incline to the view that epilepsy (using this term in the sense used in the description of the idiopathic disease) is more frequent after gunshot wound of the head than the earlier figures would lead us to expect.

In civil practice an injury to the head is a commonly assigned cause of epileptic fits. In some of these cases there is little, if any, relation between the assigned cause and the malady: in others the onset of the epilepsy is correctly attributed to the trauma.

In the war cases the relation between the trauma and the epilepsy is more definite, and the cases may be divided into two main groups:—

1. *Those with a definite organic lesion of the skull, membranes, and brain* (penetrating wounds). Epilepsy following a penetrating wound of the head may be either partial, focal, or Jacksonian: or the seizures may conform to those of generalized idiopathic epilepsy with loss of consciousness. It will be shown here that focal or cortical epilepsy following gunshot or shrapnel wound of the skull and brain is relatively rare, occurs early, and tends to disappear, while the generalized type of epilepsy is common by comparison, of later development, and runs a chronic course.

2. *Those without obvious evidence of injury to the skull* (scalp and

non-penetrating wounds). There are numerous cases in which a minor head trauma has been followed by fits of a generalized epileptic character within a short period of the injury and without a history of previous epilepsy. X-ray examination of the skull may not reveal fracture of the bone, and yet a short period of loss of consciousness may have followed the infliction of the wound. In the observed cases the first fit followed within a short period—a month or two—after the trauma, and the subsequent course of the disability has been that of generalized epilepsy.

Of somewhat similar character, and probably classifiable in this group, are those cases of epilepsy which follow upon aeroplane crashes and falls on the head from horseback, motor cars, etc. Several such cases have come under observation, and have been attributed to fracture of the base of the skull, of which, however, no direct evidence has been obtained by *x-ray* examination. It is impossible in these cases to eliminate a cerebral concussion, local contusion, or laceration, which may have been the starting-point of the disability. Jefferson,⁵ in an investigation into the early effects of gunshot wounds of the scalp, without fracture of the calvarium, reports a series of 54 such cases, of whom 17, or 31.5 per cent, showed neurological evidence of local cerebral contusion, and all but five a cerebral disturbance of some kind. Trotter says that it is quite unimportant whether the bone shows evidence of injury on *x-ray* examination. The bone indeed may have recovered its shape completely and have sustained no fracture, and yet have caused a distinct local lesion of the brain.

In cases which have been submitted to operation, a fracture of the inner plate of the skull, an extradural clot, or a contusion of the subjacent cortex has been observed; and in old-standing cases an ill-defined cystic degeneration, a patch of sclerosis, or of adhesion between the membranes and the brain has been detected.

TRAUMATIC EPILEPSY.

This is defined as a disability characterized by seizures having the features of ordinary generalized epilepsy, occurring as a late phenomenon in consequence of an injury to the brain and its membranes, following a gunshot, shrapnel, or other wound of the skull. Under the term are included all fits, seizures, or attacks recognized as of an epileptic character, whether of the major, minor, or psychic variety. The observations were made solely upon officer patients, who came before a medical board for the assessment of their disability. They had been certified by competent medical authorities as suffering from traumatic epilepsy. The majority were observed upon one occasion only, but a full record of the medical history was before the board at the time of the examination.

Generalized traumatic epilepsy may follow a wound of any region of the brain except the cerebellum. Of the 38 cases recorded in *Table A*, 10 were wounds of the frontal lobe, 16 of the parietal, 9 of the occipital, and 3 of the temporal lobe. The parietal region provides the greatest number of cases, and there is reason to believe that wounds of this region have a greater tendency towards epilepsy, quite apart from the greater frequency of the wounds in this locality. Behague⁶ indeed states that twice as many parietal wounds are followed by epilepsy as occipital wounds.

Table A shows also the great frequency of associated paralytic and other symptoms. In the case of the frontal injuries, impairment of memory was a prominent feature, while certain local paralyses, more especially from injury of the optic and oculomotor nerves, were observed. In the parietal region, with only two exceptions, all the cases showed some degree of motor or sensory paralysis, or a combination of motor and sensory paralytic symptoms. The sensory defect consisted mainly of some degree of 'sensory hand' characteristic of cortical sensory paralysis. Nine out of ten occipital-lobe cases presented some degree of hemiopic visual defect. In two of the three cases of wound of the temporal region, deafness of the corresponding ear was present.

A gunshot, shrapnel, or other wound of the head of a penetrating character may be followed at once by generalized epileptic fits, or by unilateral fits in the limbs on the side opposite the injury. The local lesions vary considerably, and consist of fracture of the bones of the skull usually associated with contusions of the cerebral tissue and oedema, and sometimes followed by sepsis and abscess formation. In other cases a haematoma may be present. In less severe cases a localized contusion or laceration of the brain may be the immediate consequence of the wound. X-ray examination of the head in some cases of epilepsy reveals the presence of fragments of metal deeply implanted in the cerebral hemispheres. In one case (No. 25) a fracture of the inner table causing contusion of the cortex was followed by epilepsy, which persisted until a trephining operation was performed three years later.

Neither the extent of the bony lesion nor the severity of the original cerebral trauma appears to influence the development of the seizures. In the majority of cases the original trephining or subsequent operation had left a large gap in the skull, with or without visible pulsation or impulse on coughing. The exceptions to this were seen only in cases of 'gutter wound', or in 'through-and-through' wound.

In most of the cases of wound, especially of the parietal and occipital regions, the neurological examination showed evidence of

destruction of cerebral tissue, leading to hemiplegia or hemianopia, with extensive scarring or cicatricial adhesion of the brain to the membranes and the scalp.

It was especially striking in how few of the observed cases was there a history of convulsions at the time of the infliction of the wound. Although cases with a history of convulsions immediately following the trauma in some instances develop traumatic epilepsy later on, such a sequence is rare.

Adie and Wagstaffe, in a report to the Medical Research Committee (1918, No. 1) upon the immediate effect of gunshot wounds of the head, refer among other matters to the development of fits. They state that fits occur immediately in only 5 per cent of cases which recover, including all varieties of gunshot wound. These fits are observed during the first week, they never spread out over a period longer than three days, and there is an exact correlation between the site of the wound and the point of origin of the fit. The authors conclude that these cases are not more likely to develop traumatic epilepsy later on than other cases of head wounds.

One of the outstanding features therefore of traumatic epilepsy is the development of the disease some months after the receipt of the trauma, and the absence of any definite or constant relation between the injured region of the brain and the method of onset of the major fit.

The *time of onset* of the epilepsy after the receipt of the wound is a point of interest. Of the 36 cases in which the date of the first seizure was definitely known, fits commenced in 21 at some period between the second and the twelfth month: and in 25 during the first year: in the remainder the onset was at any time from the end of the first year up to two and a half years after the wound. In the majority of cases, therefore, epilepsy develops before the lapse of twelve months: but the 'latent period' may persist for much longer.

As regards the *frequency* of the seizures, there is no essential difference between them and those of ordinary epilepsy, although in the traumatic form the appearance of a fit at long intervals is probably more common than those of frequent recurrence.

In *character* the fit resembles that of ordinary generalized epilepsy, and all varieties of seizure may be seen, from a momentary 'absence', 'lapse', or epileptic vertigo up to the fully-developed seizure of major epilepsy with fall, tongue biting, and unconscious urination.

Sometimes there is a focal or Jacksonian aura. In these cases the aura alone may occur in the intervals between the major fits and form the minor type of seizure. Thus, in wounds of the parietal region a focal commencement has been noted in the face or hand; but the generalized seizure is the common expression of the malady.

In occipital wounds, 'flashes of light' or 'flickerings' have been described as warning sensations; but the major attacks are generalized. In the frontal-lobe cases the attacks were of a general character, without warning. On the other hand, according to Netter,⁷ generalized traumatic epileptic seizures differed from those of idiopathic epilepsy in the greater frequency of an aura, the nature of which depends upon the seat of the lesion and the predominance of convulsions on the opposite side of the body to that of the trauma.

It has been noted by several writers that psychical attacks are rare, but that epileptic equivalent symptoms occur not uncommonly in the form of vertiginous attacks and paroxysmal headaches.

Attacks of vertigo in cases of gunshot wound of the head are very common, and frequently offer difficulty in diagnosis. In some cases they are undoubtedly epileptic in character, and in one instance a trephining operation arrested the major fits, but a petit mal form of vertigo persisted. In other cases vertiginous seizures would appear to be due to slight changes in the labyrinth, unaccompanied by gross evidence of labyrinthine disorder. Chartier⁸ refers to a 'reflex vertigo' which has a close relation to the 'formes frustes' of epilepsy. This occurs in small attacks of sudden origin, and may be accompanied by a transitory disturbance of equilibrium and temporary congestion or pallor of the face.

In nearly all the cases some change was noted in the *mental condition*. Memory defect, impairment of concentration, an anxious outlook, and 'nervousness' were commonly associated symptoms, irrespective of the site of the wound. In some the mental reaction was definitely retarded. In others a fear, amounting almost to an obsession, that a blow on the head over the bony gap would have fatal consequences, was admitted by the patient. In none of these respects, however, does the epileptic differ from what is found in non-epileptic cases of serious gunshot wound of the head with large bony deficiency.

FOCAL OR JACKSONIAN EPILEPSY.

In *Table B*, 10 cases of focal epilepsy are recorded. In 6 the attacks were of a temporary duration, and disappeared after trephining or spontaneously ceased. Of the remaining 4 cases, focal fits or occasional involuntary twitchings persisted, and were continuing when the patient was last observed. In one case (No. 8) there was a history of a generalized convulsion nearly four years after the infliction of the wound, but the continuing epilepsy was in the form of minor Jacksonian attacks without loss of consciousness. With only one exception (No. 10) these patients had been trephined, and presented a large gap in the cranium, with or without pulsation, and several of them showed associated paralytic symptoms, such as hemianopia

visual defect or sensory paresis. There were no paralytic symptoms in the two cases in which the frontal region was affected.

The outstanding feature of these cases is the tendency which exists towards spontaneous cure. In this respect they differ materially from the cases of generalized traumatic epilepsy. This condition is not epilepsy in the ordinarily accepted meaning of the term. It is a condition of localized cortical irritation. It arises at an earlier period than traumatic epilepsy, and is more amenable to surgical interference. Once the attacks have ceased, there does not appear to be any special tendency towards relapse.

PROGNOSIS AND TREATMENT.

Out of 38 cases of generalized traumatic epilepsy, the fits ceased for a period of twelve months or more in only 5 instances, and in one of these a relapse occurred after freedom for two and a half years. Some of the patients took bromides, but many resorted to no medicinal remedy. Of the series, 3 patients had been subjected to bone-grafting operations upon the skull, and 1 to the insertion of a celluloid plate. Of these, 2 derived some benefit, and the other 2 were definitely worse after the operation.

It is difficult to say what features of traumatic epilepsy favour cessation of the fits or promote their recurrence. The severity of the original wound does not appear to be material, and the extent of the gap in the bone would seem to play no part in the continuance of the disability. Infrequent attacks, as one would surmise, are more favourable than frequently recurring seizures. There were a few instances in which the major fits ceased, but the disorder was continued by the recurrence of attacks of an 'aura' or petit mal type. Lesion of the frontal lobe was the most favourable locality, as 3 of the 4 arrested cases had wounds in this situation.

Operations such as bone-grafting or the insertion of a celluloid plate between the brain and the scalp (Sargent's method) have been well spoken of, and the publication of the results upon the cases treated in this way is awaited with interest. Of the 4 cases in this series in which plastic operations had been performed, the results leave considerable room for improvement.

The unsatisfactory outlook in the majority of cases of generalized traumatic epilepsy is due probably to the fact that the fits are not attributable solely to an irritation or the local effect of scarring or cicatricial adhesions about the cortex cerebri, but are evidence of a generalized epilepsy in which local destructive lesions play only a minor part, once the epilepsy has been established.

A reference to *Table B* will show that true focal, cortical, or Jacksonian epilepsy develops more early than the generalized form,

and rarely passes into it. The 'latent interval' in the generalized variety is an essential and characteristic feature of the disease.

Cranioplasty in conjunction with permanent separation of the brain from the scalp in traumatic epilepsy has been advocated and carried out in a number of patients.

Sargent⁹ has had large experience of operation in this class of case, and states that the results are promising, even when the fits have recurred over a long period of time. He states also that fits can in many cases be either abolished or very considerably reduced in numbers by an operation which succeeds in removing, or at least modifying, the local existing cause. We have yet, however, to see the permanent effects of operation upon the incidence of the seizures in traumatic epilepsy, as sufficient time has not elapsed to establish the permanency of a cure. Moreover, a relapse even after a number of years' freedom from fits is no uncommon feature of epilepsy.

On the other hand, operation is regarded by several writers with disfavour. Rawling¹⁰ states that his experience is such that he does not consider operative measures are of much avail, though in some instances the plating of the defect has brought about some benefit. Redlich¹¹ writes unfavourably of the results of surgical treatment, as well as of the effects of the bromides and of luminal.

Behague¹² states that surgical intervention is dangerous, and that cranioplasty may favour the onset of epilepsy. In pre-war days also it was recognized that the results of surgical interference in cases of traumatic epilepsy were not encouraging.

CAUSATION.

When attention is diverted from the clinical history and features of the generalized seizures of traumatic epilepsy and is directed towards finding an explanation of these symptoms, a difficulty is at once encountered: and it is necessary to inquire how far the local conditions at the seat of wound may explain the phenomena, or to what extent a constitutional predisposition to nervous instability or epilepsy may play a part.

The immediate cause of epileptic fits has been for a long time the subject of speculation and conjecture. The theories of cardiac inhibition, sudden cerebral anæmia, intravascular clotting, and vasoconstriction of the cerebral arterioles have been urged from time to time as physical factors in their production. In cases of Jacksonian epilepsy following gunshot wounds of the head, Leriche¹³ noticed that the onset of a seizure was preceded by an arrest of cerebral pulsation and a blanching of the pial blood-vessels—a concrete observation bearing upon the theory of vasoconstriction as the cause of epileptic seizures.

He noticed also that the tension of the cerebrospinal fluid was below the normal in these cases.

Sargent also observed the rapidity with which circulatory changes occur in the exposed cerebral cortex, and has contended that the vasomotor changes in the brain at the seat of the wound may explain the phenomena of the tonic stage of the epileptic fit, and has suggested that the cause of these changes may be found in the 'anchoring' of the brain to the overlying membranes and scalp; and that the cicatricial changes which have succeeded to the original lesion favour the onset of convulsions under conditions of sudden change of posture in those who have "a low degree of stability of the nervous tissue".*

In this connection also it should be borne in mind that the seizures are those of generalized epilepsy, and may or may not be preceded by a local warning. It has been shown in this paper, and the observation has received corroboration by others, that Jacksonian or focal epilepsy is rare except in the early stages immediately succeeding the trauma. The recurring epilepsy associated with gunshot wounds of the head does not arise as a rule until some weeks have elapsed. In the cases personally studied, the 'latent period' extended up to over two years in several instances; the most common time for the onset of the general epileptic fits being from the second to the sixth month after the injury to the head.

From these observations it would appear that traumatic epilepsy is not a focal but a generalized type of fit with loss of consciousness, and that a latent period extending up to a couple of years or more may intervene between the trauma and the first seizure, and it is a characteristic feature of the disorder. Moreover, the major or convulsive fit is one element only of the disease, all varieties of known epileptic attack being observed in cases of traumatic epilepsy.

The contention that the local conditions at the seat of wound may be the exciting agent in the production of the fit receives some support from the observation that freeing of the cicatrices from the scalp, and the introduction of a bone-graft or celluloid plate, may arrest or relieve the attacks in some cases.

It may be argued, on the other hand, that only a relatively small percentage of cases of gunshot wound of the head develop epilepsy in consequence of their wound. A large number of ex-service men, amounting to several thousands, have received severe gunshot wounds of the head in war with extensive destruction of the skull, laceration and 'anchoring' of the brain, and associated paralytic symptoms,

* H. W. Collier (*Proc. Assurance Med. Soc.*, 1922, May) states that, when taking the blood-pressure of a patient, the onset of an epileptic fit was accompanied by a drop from 120 to 80 m.m.

who have not developed epilepsy. It is therefore difficult to avoid the conclusion that something more than local tissue alterations are requisite for the production of the seizures of traumatic epilepsy, and the determining agent, in my opinion, is an inherited or inborn constitutional predisposition to nervous instability and epilepsy.

I am unable to bring forward corroborative statistical evidence of this statement from the war cases, inquiry not having been made into the family history, as it has been customary at the Medical Board at which these cases were seen to assess direct attributability irrespective of hereditary predisposition. R. G. Gordon¹⁴ has stated that a direct family history of epilepsy is seldom obtained in these cases, but that 75 per cent have a neuropathic predisposition. In a small series of 9 cases of traumatic lesion of the head, observed in civil practice, 4, or 44 per cent, gave a family history of epilepsy or mental defect—a percentage comparable with what is found amongst epileptics in general.

Whatever the nature, position, or extent of the lesion, the fit is characterized by those features which are common to and typical of an ordinary epileptic seizure.

We have yet to await observations as to the possibility of psychogenic influences in the causation of the attacks in traumatic cases.

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- ⁴ RAWLING, *Brit. Jour. Surg.*, 1922, x, 93.
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- ¹² BEHAGUE, *op. cit.*
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Table A.—GUNSHOT WOUNDS OF THE HEAD.

No.	WOUND	SUBSEQUENT CONDITION	PARALYTIC OR OTHER SYMPTOMS	EPILEPSY
a. Frontal Region.				
1	Oct. 1915. Trephined several times	Large pulsating gap in left frontal	Headaches	Fits shortly after wound and up to Oct. 1919. <i>No further recurrence</i> to Dec. 1921. Taking bromides
2	May 1915. Right fronto-malar	Scar fronto-malar region, right side	Loss of right eye. Palsy of left 5th nerve	Fits began January 1916. Continued up to Sept. 1921
3	March 1915. Fractured bone removed	Gap in left frontal bone with visible pulsation	Memory poor	Fits began June 1915 and continued every few weeks until Feb. 1921. Taking bromides
4	Jan. 1915. Mid-frontal	Transverse gap across upper frontal region	Memory poor	Fits began March 1918 and recurred till Oct. 1919. <i>No recurrence</i> up to Dec. 1921
5	April 1915. Entry below right eye. Communion right frontal	Large irregular gap in left frontal bone	Blindness left eye with ptosis. Concession changes in retina	Four fits between Nov. 1917 and Dec. 1918. <i>No recurrence</i> up to Sept. 1920
6	April 1917. Trephined: escape of brain matter	Pulsating gap over left frontal	Impairment of concentration	Fits began March 1918, and continued at intervals to July 1919
7	Aug. 1917. Comminuted fracture. Hernia cerebri	Pulsating gap over bregma and root of nose	Optic atrophy left eye	Fits began April 1918 and continued irregularly until Dec. 1920. Occasional status epilepticus. Taking bromides
8	April 1918. Trephined	Trephine wounds over left upper frontal and fronto-parietal regions	Headaches, disturbed sleep	April 1919, numerous fits: trephined. Recurrence of fits in Feb. 1920 and continuing
9	Feb. 1917. Abscess. Hernia cerebri	Fracture of both frontal bones	Mental impairment	Fits began Oct. 1917 and were continuing at intervals up till Dec. 1920
10	Sept. 1915. Trephined	Gap in right upper frontal bone	None	Fits began Oct. 1916, recurring at intervals up to Feb. 1922
b. Parietal Region.				
11	Oct. 1916. Trephined	Large pulsating bony gap in right parietal region	Left hemiparesis and 'sensory' hand	Fits began March 1917, continuing up to Oct. 1921. 'Aura' in left hand
12	July 1916. Trephined over left parietal	June 1919. <i>Bone-graft</i> of gap in left parietal bone	Temporary right hemiplegia	Fits began shortly after wound and continued to Sept. 1920. <i>No recurrence</i> up to July 1921
13	Jan. 1918. Trephined over left parietal	Feb. 1919. <i>Osteo-plastic</i> closure of bony gap	Right hemiparesis	Fits began Oct. 1918 and continued to March 1921: of a severe character
14	Sept. 1916. Trephined. Hernia cerebri	Large bony gap with pulsation in left upper parietal	Right hemiparesis. Memory poor. Slow mental reaction	Fits began Nov. 1917 and were continuing frequently up till Feb. 1921
15	Jan. 1916. Right parietal vertex	Depressed bony scar in right upper parietal region	Weakness of left hand grip. Headaches. Memory poor	May have had a few faints at school. Fits began in Dec. 1916 and he has had 5 up to Feb. 1921
16	July 1916. Right parietal	No evidence of any lesion of bone	Left hemiparesis. Headaches	Fits began late in 1916 and were continuing up to Sept. 1920
17	May 1915. Trephined	Gutter depression with slight pulsation in left parietal bone	Right hemiplegia with 'sensory' hand	Date of onset of fits uncertain, but continuing in June 1920 at irregular intervals

Table A.—GUNSHOT WOUNDS OF THE HEAD—Continued.

No.	WOUND	SUBSEQUENT CONDITION	PARALYTIC OR OTHER SYMPTOMS	EPILEPSY
18	Nov. 1917. Trephined	Large bony gap with visible pulsation in right upper parietal	Left hemiplegia. Phobia	Fits began in Jan. 1918 and were continuing at frequent intervals up to Jan. 1921; local warning in left face and arm
19	Aug. 1916. Trephined	Gap in bone over right parietal eminence. No pulsation	Amputation of right arm. Defective memory	Fits began May 1917 and were continuing every two or three months in Dec. 1920
20	April 1915. Trephined. Abscess formed	Gap in left parietal bone below and behind parietal eminence	Partial sensory aphasia and slight visual defect in lower quadrants	Fits began in March 1916. Has had 4—last in January 1919. <i>No recurrence</i> up to April 1920
21	Nov. 1917. Right parietal wound superficial	Superficial scar over upper right parietal near sagittal suture	Neurasthenia (scalp-wound case)	Fits began in Dec. 1917 and continued to July 1919. <i>No recurrence</i> to May 1920
22	Oct. 1917. Trephined	Gap in right fronto-parietal region. No pulsation	Left hemiplegia. Memory defective	Fits began early in 1918 and were continuing in Nov. 1920. No relief from bromides
23	May 1918. Trephined	Gap in bone in right parietal region	Temporary left-sided hemiparesis	Fits began several months after wound and were continuing in June 1919
24	Aug. 1919. Trephined for fractured skull	Large gap in right upper parietal with pulsation	Left hemiplegia. Dysarthria	Fits began Nov. 1919 and were continuing at intervals Oct. 1922
25	Nov. 1917. In Oct. 1920 trephined for fracture of inner table of skull and contusion of cortex cerebri	Gap in bone in left upper parietal region	Headaches. Memory poor	Fits began in Jan. 1918 and continued until operation in Oct. 1920. Since then occasional 'vertiges'
26	May 1916. Trephined	Gap in bone in right parietal. Pulsation	Left hemiplegia	Fits began in July 1916 and were continuing in April 1922
c.	Occipital Region.			
27	July 1916. Trephined on left upper occipital region	In Oct. 1920 cicatrix excised and <i>calubroid plate</i> inserted into gap in occipital bone	Sector loss of visual fields downwards to right side	Had a fit after original operation. About 15 fits up to Oct. 1920 (second operation). <i>Since this only 'visual aura' sensations</i> up to Feb. 1921
28	Feb. 1917. Trephined	A gap in left occipital bone with pulsation	Sector loss of visual fields downwards to right side	Fits began in June 1917 and continued to June 1919, but numerous 'flickerings' persisted up to March 1920
29	February 1915	Gap in right occipital bone with pulsation	Right-sided hemianopia and small sector to left side	Fits began in Nov. 1915 and have continued at intervals (with 2½ years' freedom) to April 1920
30	Sept. 1917. Trephined. Hernia cerebri	Gap in right occipital bone with pulsation	Right-sided hemianopia	Fits began Nov. 1918 and were continuing in Sept. 1920
31	May 1915. Trephined. Hernia cerebri	Large gap in bone in occipital region mainly on right side	Left-sided hemianopia	Fits began in Oct. 1917 and were continuing in Sept. 1920
32	April 1918. Trephined. Abscess in left occipital lobe	Feb. 1920. <i>Bone grafting operation</i>	Right-sided hemianopia	Seems to have had minor attacks up to June 1921, when major fits began, which were continuing in April 1922
33	June 1916 in left occipito-temporal region. Abscess said to have formed in frontal lobe	Large bony gap with pulsation in left fronto-parietal region	Right hemianopia. Memory bad	Date of onset of fits uncertain, but fits of a 'psychical' type were continuing frequently in Jan. 1922

Table A.—GUNSHOT WOUNDS OF THE HEAD—Continued.

No.	WOUND	SUBSEQUENT CONDITION	PARALYTIC OR OTHER SYMPTOMS	EPILEPSY
34	July 1916. Lambdoidal region	Irregular depressed bony scar over lambdoidal region	A temporary weakness of right arm	Vertiginous attacks began in Aug. 1918 and were continuing in May 1922
35	Sept. 1917. Trephined in Jan. 1918	Bony gap in left parieto-occipital region	Right-sided hemianopia. Headache	Fits began in Nov. 1919 and were recurring at intervals in Oct. 1922
<i>d. Temporal Region.</i>				
36	Sept. 1916. Posterior temporal region. Trephined	Depressed scar right posterior temporal region; slight pulsation	Deafness right ear. Mental reaction slow	Fits began June 1918 and were continuing at intervals in Sept. 1921
37	March 1918. Zygomatic region right side; bone removed	Depressed bony scar behind right angular process	Detachment of right retina	Fits began in Oct. 1919 and were continuing in May 1920 with considerable frequency
38	Sept. 1916. Left mastoid region	Depressed scar and bony deficiency over left mastoid	Atresia left external meatus; deafness left ear, and left facial palsy	Fits began in Jan. 1920 and were continuing in Oct. 1922. There is an aura of smell

Table B.—JACKSONIAN EPILEPSY.

No.	WOUND	PERMANENT STATE	ASSOCIATIONS	FOCAL EPILEPSY
1	March 1918. Right parietal region	Gap in right parietal bone	Headaches	Fits on left side after wound. Trephined—removal of clot. No further fits at Jan. 22, 1920
2	March 1916. Left parietal region; depressed fracture. Trephined	Gap in left parietal bone	Partial sensory aphasia	Two focal fits in Sept. 1916. No further fits at July 7, 1919
3	Feb. 1915. Left parietal region; bone depressed. Trephined	Gap in left parietal bone	Right 'sensory' hand	Focal fits shortly after wound. No further fits up to April 8, 1920
4	Sept. 1916. Right frontal abscess of brain followed	Gap in bone in right fronto-temporal region	None	Convulsions following wound. No further fits up to Oct. 27, 1920
5	Oct. 1914. Right parietal region. Trephined	Gap in lower part of right parietal bone	Slight weakness of left hand	Focal fits in June and Oct. 1915; occasional involuntary twitchings of fingers of left hand persisting up to Oct. 1920
6	Dec. 1914. Gutter wound of left parietal region; bone splintered	Antero-posterior gutter wound of left parietal bone	Giddiness; Tinnitus. Memory poor	Occasional twitchings of right arm without loss of consciousness persisting from time of wound up to July 1920
7	Dec. 1916. Left parietal region	Gap in left parietal bone	Giddiness. Mentally dull	Two focal fits after wound for which he was trephined. No further fits up to July 1919
8	Jan. 1917. Left fronto-parietal region. Trephined	Large gap in bone, left fronto-parietal region. Pulsation	Impaired power of concentration. No paralysis	Occasional twitchings and spasms in right arm and hand, with temporary loss of power continuing to March 1922. History of a convulsion in Oct. 1921
9	Aug. 1918. Left parietal region. Trephined. Hernia cerebri	Large gap with pulsation in left post-parietal bone	Some hemianopic visual defect to right side, and right deep reflexes in excess of left	Attacks of numbness of right hand, with temporary aphasia recurring every 3 or 4 months and persisting up to Sept. 1921
10	Aug. 1916. Right parietal region	Scar without loss of bone over right parietal eminence	Vertigo. Headache.	Focal fits followed the wound, but no further fits up to Nov. 1922

THE PHENOMENON OF ABREACTION.

By R. G. GORDON, BATH.

EVER since the publication of *Studien über Hysterie*¹ by Breuer and Freud, the phenomenon of abreaction has been familiar to psychotherapists; indeed the observation of this phenomenon was the foundation of all analytical theory and practice. These observers, while treating certain patients by hypnosis, discovered certain forgotten memories whose revival was accompanied by considerable emotional reaction. This in itself was of great therapeutic benefit, and for a time constituted the method of cure adopted by Freud himself. Later, he found that this alone was not enough, and proceeded to develop from it the elaborate technique of psycho-analysis. Later workers have held that this revival of the memory of psychic traumata with the accompanying emotional reaction must not be taken too seriously; for example, Jung² refers to it, and says: "I too soon discovered that certainly some traumata with an obvious etiological tinge are opportunely present. But the greater number appeared highly improbable. So many of them seemed so insignificant, even so normal, that at most one could regard them as just providing the opportunity for the neurosis to appear. But what especially spurred my criticism was the fact that so many traumata were simply inventions of phantasy which had never really existed. This perception was enough to make me sceptical about the whole trauma-theory. I could no longer suppose that the hundred and one cathartic experiences of a phantastically puffed-up or entirely invented trauma were anything but the effect of suggestion. It is well enough if it helps. If one only had not a scientific conscience and that impulsion towards the truth! I found in many cases, especially when dealing with more mentally gifted patients, that I must recognize the therapeutic limitations of this method." However this may be, everyone will agree that the phenomenon does occur and is apparently attended by therapeutic benefit, though it may have little to do with the true etiology of the neurosis. Some workers, notably Dr. William Brown,³ attach more importance to this factor in treatment *per se* than do others. Dr. Brown regards psychocatharsis or abreaction as an essential part of the cure of neurotic symptoms. He holds that "the emotional tone of the individual experiences is retained in the mind in the same way in which these experiences

themselves are retained". He also speaks of the bottling-up of energy at the time of the original trauma, and the freeing of this bottled-up energy by means of the abreaction.

The explanation seems very inadequate, for how can 'emotion' be bottled up, or, for that matter, retained as such? Such expressions are all very well if it is remembered that they only represent policies useful for descriptive purposes; but if we are to have any conception of what happens from a physiological point of view, we must find some other means of expressing the phenomenon. From this standpoint we must assume that psychic experience depends on activation of groups of neurones in the nervous system; and if we can get any idea of what happens to these neurones when abreactions occur, we are in a position to bring into line the physiology of the higher levels of the nervous system with the theories pertaining to the lower levels which already find acceptance. Objectively what happens under such circumstances is that, in the course of the establishment of associations during the analytical process, a pattern of ideas having become fully conscious, the patient describes the memory image, and with this he exhibits signs of more or less intense affective experience in the form of various activities of structures innervated by the vegetative nervous system. Subjectively, he recognizes a set of ideas with a sense of 'againness', and further refers them more or less accurately in time and space, which, as will be seen later, are functions associated with consciousness, or, in neurological terms, integrations on the cortical levels. At the same time he undergoes affective experiences, which may be largely undifferentiated, or the feeling may be sufficiently integrated with cognitive and conative elements to constitute a definite emotion.

The set of ideas or complex which is revived has reference to some incident in the past which has itself been associated with affective experience of considerable intensity, but which has been wholly or partially repressed or suppressed, to use Rivers's¹ terms, and consequently forgotten.

It is important to be clear as to what is meant in physiological terms by this process. It is evident that in the realm of anatomy and physiology at any rate we cannot talk of either the idea or the feeling being retained as such. We may, however, suppose that when a given stimulus activates a certain collection of neurones (an engram), that engram is modified by the activation: that such engrams will include neurones of the vegetative nervous system as well as neurones in the central nervous system: that if the spread of activity through the central nervous system neurones is for any reason interfered with, the activity will tend to spread in the vegetative neurones, thereby inducing more intense feeling: and vice

versa, if vegetative activity is inhibited, either more intense or more widespread neuromuscular activity will take place in the form of action and thought. Such partial inhibitions probably explain various neurotic phenomena. The inhibited neuromuscular action with the 'drain' to the vegetative system explain such symptoms as the crises of panic so common in the deficiently adapted extravert. The 'drain' to the neuromuscular system of the diffuse type explains various obsessive thoughts; and of the more intense type, obsessive actions, and perhaps under different circumstances certain alterations in postural tone, tremors, etc. This 'drain' from certain neurones of an engram is equivalent to the suppression of the results of the activation of these neurones. This phenomenon is common enough under normal conditions, as, for example, in the emotional reaction of fear. Probably we have all experienced a condition in which neuromuscular activity is suppressed and affective activity is allowed full play. The suppression of the affective activity is referred to by Rivers⁴ in his description of what he calls manipulative activity in the presence of danger. "Highly complex acts designed to allow escape from, or to overcome, the danger, are carried out as coolly as, or even more coolly than, is customary in the ordinary behaviour of daily life. There seems to be in action a process of suppression of the fear or other affective state. That there is such suppression is supported by the fact that fear may be present, perhaps in an intense form, if the experience is reproduced later in a dream." Such interference, which may prevent the natural outcome of central neurone activation in the form of muscular work, may be due to the activation of other engrams which exert an inhibitive influence on the spread of activity, as Head, Sherrington, Pawlow, and others have shown to take place on the lower levels. We have then, as the result of the stimulus induced by any given contact with environment, a definite engram established in the nervous system. If this is activated by any subsequent stimulus, a pattern of feeling, thought, and action will be observed subjectively and objectively which will resemble more or less closely the psychological and neurological effects of the original incident according as the original engram was definitely delimited; but the patterns induced will probably never be exactly the same, inasmuch as a new stimulus must activate other neurones. Such a pattern of thought, feeling, and action will constitute an image of the previous incident which will be said to be remembered whenever the engram is reactivated.

Another factor may come in. The activity of the vegetative neurones will determine the secretion of various endocrine glands, and although our knowledge of the effect of variations in the concentration of these secretions on the delicate synaptic adjustments may

be said to be non-existent, it is not unreasonable to suppose that it is by some such means in relation to the affective experience of pleasure and pain that the relationship of the various neurones to each other is modified. The exact details of what happens are far too complicated to allow us to describe exactly how any engram becomes dissociated from the general mass of neurone systems: but it may be presumed that its synaptic junctions are so affected that the activation of its neurones in just that combination is inhibited, and it remains more or less incapable of being reactivated as a whole in just such a way as to reproduce subjectively an image of the original happening. As Rivers has remarked, it is the sets of ideas associated with the most intense emotions which tend to be repressed, i.e., those patterns whose activation depends on activity of a large proportion of vegetative neurones which at the same time induce changes in the endocrine glands. As a rule, certain elements of that engram are capable of reactivation, and if they come into relationship with other neurone systems a new pattern of thought, feeling, and action having some symbolic relationship to the original happening may be present in consciousness, as a result of the activation of this engram formed, so to speak, out of parts of the suppressed engram, by the process referred to by Rivers as fusion. This is a common feature amongst neurotic patients. For example, to relate a case in actual historical order, that is, in inverse sequence to its elucidation in the course of analysis. A child brought up in a Calvinistic atmosphere and having been strongly impressed with the danger of hell fire, was possessed of precocious musical talent, and from an early age was destined for a career on the concert platform. When about seven she was taken to see 'Faust', which impressed her very much, both from the point of view of the music and the drama. Soon after this she broke a valuable vase belonging to her mother, of whom she was afraid, and hid it in the dustbin, and, as luck would have it, was present next day with her mother when the dustmen came to remove the rubbish. She immediately fell into a panic lest she should be discovered, and, remembering 'Faust', vowed her soul to the devil if she should escape detection. She was not discovered, and soon after was overwhelmed by what she had done. The memory of this occurrence was soon dissociated and suppressed, but there remained an inordinate fear of death, which later on was modified into a general fear of illness. The image of the original incident was revived in the course of mental exploration with marked abreaction. Here, then, was a pattern that had become dissociated from the rest of conscious content, and this must have depended on an inhibition of activation of the corresponding engram; but, as has been seen, symbolical representations were possible.

The point of inquiry which I wish to deal with in the present

paper is the explanation of the affective reaction which accompanied revival, and the improvement in the general health of the patient which ensued. The theory of memory which Professor Lloyd Morgan put forward in his Gifford Lectures seems to throw some light on this question. He describes six criteria involved in memory, to wit, the register, registration, retention, revival, recognition or renewal with a sense of againness, and reference in time and space. The register, registration, and retention are already observable on the plane of physics and chemistry. Any object can serve as a register; a stimulus coming from outside is capable of registering an impression on it, and that impression can be retained: but revival is not met with on this plane. With the emergence of life, however, revival is possible, and indeed is an essential feature of life. For example, the leaves of the trees are revived each spring, the mental and bodily characters of the offspring are revivals of those of its ancestry. Such revival is not necessarily conscious, and in the examples given is not so. Recognition of the revival with the sense of againness is, however, a conscious process, but it does not necessarily involve reference; we may be quite sure we have heard or seen a thing before without being able to say when or where; this reference involves a still higher integration, and corresponds to the type of function of the frontal lobes as described by Professor Bianchi.⁵ It will be noticed that each of these criteria of memory involves more and more complex integrations, and that the higher ones involve the co-existence of the lower ones—revival is impossible without registration and retention; recognition is impossible without registration, retention, and revival; and reference without recognition and the rest. But it cannot be too strongly insisted on, that by retention it is not meant that the image or feeling is retained as such. As Lloyd Morgan says: "What is retained is not that which is mentally reproduced, but some organic precondition of its so-called revival, such as is afforded by some neural engram. There is, strictly speaking, no revival (in the etymological sense) of the memory image as from sleep or trance: there is a new birth of an image-child like unto, but yet differing from, the parental percept. Secondary retention is of the same order as that which might be called tertiary retention, in the plant, of the capacity of flowering in the spring. Ghostly blossoms are not retained; but new flowers are produced by the plant in due season and under appropriate conditions. So, too, images blossom forth to-day and reproduce with a difference the likeness of percepts of weeks, months, or years ago."

To return to our dissociated engram involving percepts of vase, dustman, mother, Faust selling soul to the devil, etc., in association, and its revival with abreaction: this 'feat of memory' brought about

by analysis involved revival, recognition—i.e., the revival with a sense of againness—and reference in time and space. Can we, along these lines, get any explanation of the abreaction and of the therapeutic benefit? I believe we can.

In the process of analysis all sorts of associations are established on the level of consciousness. Sooner or later, in the various combinations which occur, the synaptic resistances which have inhibited the reactivation of the dissociated engram are evaded or overcome, and it is again associated with the rest of the personality at the level of consciousness. The pattern which depended on this engram involved thought, feeling, and perhaps action: hence, when the engram was again reintegrated on the level of consciousness, its activation involved the production of a cognitive image like the original experience, and feeling corresponding to the original feeling. However, it is not only that reactivation on a conscious level of the vegetative neurones of the original engram induces an affective experience; there is something else. This revival with a sense of againness in addition to its cognitive properties itself involves affective experience. There is definite feeling attached to this recognition, as we all know from personal experience. Translating this into neurological terms, recognition involves the activation of neurones of the vegetative nervous system independently of any reactivation of such neurones involved in the original engram. I would suggest that it is the summation of these vegetative activities with their accompanying affective experience which accounts for the phenomenon we describe as abreaction.

The therapeutic benefit induced by this revival with abreaction depends, in my opinion, not on the abreaction itself, which is an incidental accompaniment of the essential reintegration of the pattern on the level of consciousness, but on the still further involvement of reference in this process. In the example quoted, the patient not only remembered the incident with a feeling of againness, but she was also able to say that this incident occurred at such and such a place and at such and such a time.

As has been said above, the reference of an incident to time and space is the function of the higher cortical levels. This is clearly seen in Head's⁶ observations on sensation in relation to the sensory cortex. Epieritic sensation essentially involves accurate discrimination in space, as opposed to the diffuse and radiating reference of protopathic sensation. Hence we may see that when a complex is thus referred it is organized on the cortical level. But another function of the cortex is the control which it exercises over the lower levels. This is particularly well seen in relation to both the motor and sensory cortex. Head, Rivers, and Holmes⁶ have shown how

cortical function involves a partial fusion and partial suppression of thalamic function. It is clear also that on the cortical level the various functions depend on each other to a remarkable extent. For example, if the sensory cortex corresponding to one hand is injured, not only will the sensation of the hand be impaired, but its motor function will be deficient as well, as a result of the hypotonia induced. Similarly on conceptual levels the dropping out of any sentiment, or even of a less well organized set of ideas, will upset the nice adjustment required for perfect health. It is on this that the unity of the personality depends, and it is in this respect that the neurotic experiences his failures and difficulties. His personality is not integrated and unified, and consequently he is the subject of continual conflict. From this it follows that the reintegration of any complex must be of therapeutic value. If and when the complex which was reintegrated in the course of treatment was the only one seriously dissociated from a personality—that is to say, the only pathological complex, if this expression is not a tautology—the patient will be cured. Such simple examples occurred not infrequently during the war, and have been quoted in large numbers by writers on war neurosis, and though less frequent are by no means unknown in civil practice. In the majority of cases, however, while the reintegration of any one complex will confer benefit, this is by no means the whole story, and consequently further treatment is necessary. Such was the case in the patient, part of whose history I have quoted in the story of the broken vase, but the rest has no bearing on the present argument.

In conclusion, what I particularly wish to emphasize is that in psychotherapy the phenomenon of abreaction is only incidental in the therapeutic process, and that it is not the so-called freeing of bottled-up emotion which does the good, but the reintegration of the dissociated complex into the personality by its recognition with a sense of gaininess and its reference to time and space.

It should be mentioned that both Myers and McDougall have laid stress on this from a somewhat different standpoint.⁷

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PONTO-BULBAR CRISES ASSOCIATED WITH SIALORRHOEA IN SYPHILIS OF THE NERVOUS SYSTEM.*

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I.—INTRODUCTION.

THE objects of presenting this case are to emphasize the fact that crises may occur in cases of cerebrospinal syphilis other than tabes dorsalis, and to describe a group of symptoms referable to the 7th, 9th, and 10th cranial nerves.

It is customary to associate crises with tabes. However, there seems no reason to believe that involvement of nerves or nerve centres sufficient to produce crises cannot occur without concomitant signs of tabes. Nonne¹ emphasizes this in discussing gastric crises. He says, "It is well known and has recently been re-emphasized by Dinger, that gastric crises may be the initial symptoms of tabes. There is no question as to the diagnosis of tabes when pupillary disturbances, absence of Achilles or of knee-jerks or of both, occur in such cases. This is not so in those cases in which 'characteristic gastric crises' occur at short or long intervals in those who have been syphilitic without any objective organic sign as far as the nervous system is concerned. I know of three such cases, and have been able to follow the first case for four years, the second and third cases for three years. All three patients had been syphilitic. Examination of the spinal fluid in all three showed a mild grade of lymphocytosis. I had not begun testing for globulin when I was first consulted by these patients. As you will hear presently, a mild grade of lymphocytosis in the luetic is not sufficient for the diagnosis of tabes."

The case here reported presents a rare type of mixed sensory, secretory, and motor crisis which is scarcely mentioned in the current text-books, and of which the most conspicuous sign—profuse paroxysmal salivation—is only sparingly discussed in the literature of crises.

* From the Medical and Neurological Divisions of Montefiore Hospital, New York. Read before the Section of Neurology and Psychiatry of the New York Academy of Medicine, April 11, 1922.

II.—LITERATURE.

The first note of salivation in tabes which we have been able to discover is in Pierret's² thesis of 1876. Six years later Putnam³ reported six cases of tabes with salivation. The salivation was usually associated with some other form of crisis. One of the patients had occasional attacks during which the saliva "flowed like a fountain" for about fifteen minutes. In the case of another patient each attack of salivation lasted about seven hours. Then Pitres⁴ described a tabetic who had had gastric crises which disappeared after a few years. Some time afterward an intense salivation developed which resisted all treatment. It appeared suddenly in the morning soon after the patient arose, and lasted two to three hours; it was accompanied by a sense of heat in the upper part of the face and in the tongue. For a period of two weeks the salivation was continuous day and night. It finally ceased, but recurred two years later. There was no disturbance of taste, but the sense of smell was completely lost. In 1887 Féré⁵ described a tabetic with ocular and laryngeal crises who also exhibited paroxysmal attacks of salivation. A few years later Féré⁶ observed a taboparetic with epileptic attacks involving the right side of the face and the right arm, in whom each attack was preceded by abundant salivation. Mazataud⁷ was able to report four cases of salivation in tabes. His first patient exhibited a simple sialorrhœa. In the second patient the salivary crisis was announced by a feeling of nausea. The patient would then expectorate three or four large mouthfuls of saliva; with this he complained of a bitter taste in his mouth as well as of hallucinations of sight and hearing. Taste and smell were otherwise normal. The crisis lasted from one to three minutes only, but recurred once to five times a day. A third patient during attacks of gastric crises would experience a bitter taste in his mouth which was followed by sudden salivation lasting from one to two minutes, at the end of which time not only the salivation, but the gastric crisis as well, would cease. These attacks occurred ten times a day. The fourth patient had continuous salivation day and night: with this there was neuralgia of the left side of the face. The salivation continued for over a year, paroxysms occurring during which there was a sudden increase of secretion of saliva.

Klippel^{8,9} reports a case with autopsy findings. The patient complained of a continuous bad taste in his mouth which he likened to the taste of decayed fish. He exhibited changes in sensibility of the 5th nerve, on the face and lips, anæsthesia, formication, and flushing of the cheeks. On autopsy the salivary glands were large and much congested. In the parotid gland there were areas of round-cell infiltration, and the cells of the glandular acini were increased in

number and smaller than normal, with large nuclei. There was a catarrhal inflammation of the larger excretory ducts. In the submaxillary gland some of the acini appeared active and some inactive. He also found degenerative changes in the ganglia of Andersch and Gasser and in the 5th and 9th nerves. Klippel comments on the association of disorders of taste and smell, sensory disorders in the area of the trigeminal, tachycardia, and salivation.

André's¹⁰ patient had salivary crises lasting from two to three hours in which the flow from the left side was greater than from the right. The patient also had attacks of left-sided neuralgic pains in the face, as well as hypæsthesia of the left side of the face and tongue. Taste was normal.

Umber¹¹ described a patient who experienced intensely disgusting tastes and smells, associated with a sensation of swelling in the neck and throat and a feeling of swelling of the submaxillary glands, with profuse salivation. These symptoms always came at the end of the gastric crisis. In another of his cases the gastric crises were preceded by great salivation and a very bad taste in the mouth. In both of these cases the salivation was apparently secondary to the disturbance of taste.

Alexander¹² in 1911 described a tabetic who had attacks of burning in the mouth with salivation, as well as a bad taste. They never occurred at meals. Taste and smell were otherwise normal. The saliva was thin and watery.

III.—CASE REPORT.

The following is a report of a case of syphilis of the nervous system with salivary crises, which we have studied at Montefiore Hospital.

The patient is a married man, 35 years of age, a furrier by occupation. He entered the hospital complaining of pain in the front of the upper left chest, of loss of weight, and of weakness. He has had no illnesses, with the exception of gonorrhœa at the age of 14 and a chancre at the age of 18. He received antiluetic treatment for four weeks. He states that at this time he lost his hair in 'bunches'. Twenty months ago, while rising from bed one morning, he was suddenly seized with pain behind the suprasternal notch, which radiated to the upper part of the left chest. He describes the pain as in the chest and as a choking, pressing sensation. He then vomited three or four times. Several days later he became dizzy and fell to the floor. For the first four months these attacks of pain occurred about every three weeks. Gradually the intervals became shorter, and during the last nine months the attacks of pain and vomiting have occurred almost daily. Their duration is variable, but they usually last a whole morning, and sometimes extend over several days. The patient was first treated at a gastro-intestinal clinic until a blood examination revealed a + + + + Wassermann. This test has been taken at several hospitals. At Bellevue it was + + + +.

at Mt. Sinai + + + +, at Harlem +, and at Montefiore it has twice been negative. After the first Wassermann was reported + + + + he received fourteen doses of salvarsan and twenty mercury injections, and the Wassermann became negative. However, his symptoms continued unabated. Three weeks after the treatment was instituted the patient began to complain of attacks of *severe salivation* lasting many hours. These have persisted, and at present occur almost daily. The salivation commences in the morning and is followed by retching, vomiting, and pain in the upper chest. Food is rarely seen in the vomitus. The salivation and pain last from four to twelve hours and occasionally persist over several days. With each attack the patient feels dizzy, and must lie down or hold on to something for fear of falling. The dizzy spells, however, last only a few seconds. The patient has lost twenty pounds in weight in the last year and a half. There was very slight difficulty of urination some months ago, but this has entirely disappeared. He never suffered from incontinence.

PHYSICAL EXAMINATION.—A man of small stature, weighing ninety-six pounds. Pale, rather poorly developed, and of normal intelligence. Teeth, tonsils, and pharynx in good condition. No evidence of gingivitis such as is seen in mercurial poisoning. Tongue slightly coated. Heart and lungs normal on physical examination. No increase in the area of aortic dullness, although the *x-ray* shows a slight widening of the aortic shadow. Electrocardiogram normal. Pulse-rate continuously rapid, ranging about 100 even when the patient is at rest. Efforts to take the pulse-rate while the patient is asleep have been unsuccessful, because he is such a very light sleeper. Blood-pressure is 135/75. Abdominal viscera normal. Gastro-intestinal *x-ray* negative. Gastric analysis shows the following:—

Fasting contents	..	..	145 c.c.
Free HCl	..	..	84
Total acidity	..	..	91
Ewald test meal	..	..	150 c.c. withdrawn
Free HCl	..	..	15
Total acidity	..	..	55

This indicates hypersecretion.

The spinal-fluid Wassermann was + while the patient was at Harlem Hospital. At Montefiore it was \pm . The colloidal gold at Harlem Hospital was 0133100000, while at Montefiore it was 0111000000. The cell-count after a recent lumbar puncture showed 7 cells, globulin positive.

NEUROLOGICAL EXAMINATION.—Pupils are irregular: left larger than right. No reaction to light, but good reaction with accommodation. Extra-ocular movements normal. No changes in functions of the 5th and 7th nerves. Pharyngeal reflex markedly diminished. Laryngeal reflex absent. No objective disorder of taste or smell. No abnormalities of the vocal cords. No atrophy or fibrillary twitchings of the tongue. *Deep reflexes all very active.* No Babinski or clonus. Abdominal reflexes present on both sides, and active. Muscle, joint, and vibration senses are normal. Pain on deep pressure over the calves, and Achilles tendon elicits a normal response. There is an approximately circular area of slight hypalgesia over the upper portions of the front of the chest. This is not always present. There are no sensory changes on the back. No ataxia and no Romberg. Gait is normal.

PROGRESS.—During his stay in the hospital the patient has had attacks almost daily. His chief complaint is salivation, which, he says, induces the vomiting and which has been followed by the pain in the chest. At night his pillow has often been soaked with saliva, which drools from his mouth while he is asleep. During the attacks, as well as during the intervals, there are no sensory disorders of the face, mouth, tongue, neck, or pectoral regions. With the salivation the patient experienced a bad taste in his mouth, but there has been no objective disorder of taste or smell.

The following is a description of a typical attack.

Jan. 14, 1922.—This morning, on rising, the patient complained of burning in his throat, passing down to his chest. After dinner he began to complain of salivation and severe pain behind the suprasternal notch, passing downward and to the left. He then became nauseated, and vomited once. On examination $1\frac{1}{2}$ hours after the onset, the patient was still in severe pain. He did not remain in one position, but moved about on the bed and rubbed his hand over his upper chest. At frequent intervals he expectorated a thin saliva. Walking did not aggravate the pain. No characteristic posture. Sublingual glands large. Their openings were prominent, red, and wide open, and saliva could be seen to flow from them. Pulse 126. Blood-pressure on several measurements 200/110 to 220/140, sitting. Heart and lungs showed no abnormality. No abdominal tenderness. Over the sternum and for several centimetres on either side there was a dull-red blotchy appearance, due to the injection of minute telangiectatic vessels. This disappeared when the clothes were removed. Atropine gr. $\frac{1}{60}$ given by hypodermic injection. Half an hour later the mouth became dry and salivation stopped. Pain worse.

Feb. 15, 1922.—The attacks have become more frequent and in the last month have occurred almost daily. Salivation took place almost every night. When asleep, saliva often drooled from his mouth, wetting the pillow and awakening him. On rising in the morning he has usually vomited and the salivation has become worse. If he had not salivated the night before, he did not vomit in the morning. After vomiting, the pain commenced behind the suprasternal notch and radiated to the left. The pain was usually not acute, but very uncomfortable, and was oppressive in character. It has been difficult to draw a deep breath. Nothing but morphine relieved this. When pain has been present, urination became difficult. The attack usually passed away at noon, and in the afternoon he felt well. Sometimes the attack persisted for several days. During the attack he cannot eat or drink.

During one of the intervals the patient was given $\frac{1}{2}$ gr. of pilocarpine hypodermically. This induced a very profuse salivation lasting about half an hour, as well as marked perspiration of the whole body, and abdominal cramps. No pain in the chest, nausea, or vomiting appeared. The saliva could be seen running from the parotid and sublingual ducts. The blood-pressure fell from 130/90 to 100/65. The patient has received no salvarsan or mercury for about six weeks, and shows absolutely no evidences of mercurialization.

IV.—DISCUSSION.

This patient does not present any of the signs of tabes dorsalis, but rather the picture of syphilitic cerebrospinal meningomyelitis.

In addition there are the following signs and symptoms:—(1) A profuse secretion of thin and watery saliva; (2) Gastric hypersecretion; (3) Attacks of vomiting related to salivation; (4) Tachycardia; (5) Attacks of high blood-pressure; (6) A sensation of bad taste in his mouth; (7) Pain in the suprasternal notch radiating downward and to the left; (8) Diminution of pharyngeal and absence of laryngeal reflexes.

Site of the Lesion.—All of these signs and symptoms are referable to involvement of the 7th, 9th, and 10th cranial nerves. If we assume that the involvement lies within the pons and medulla it is

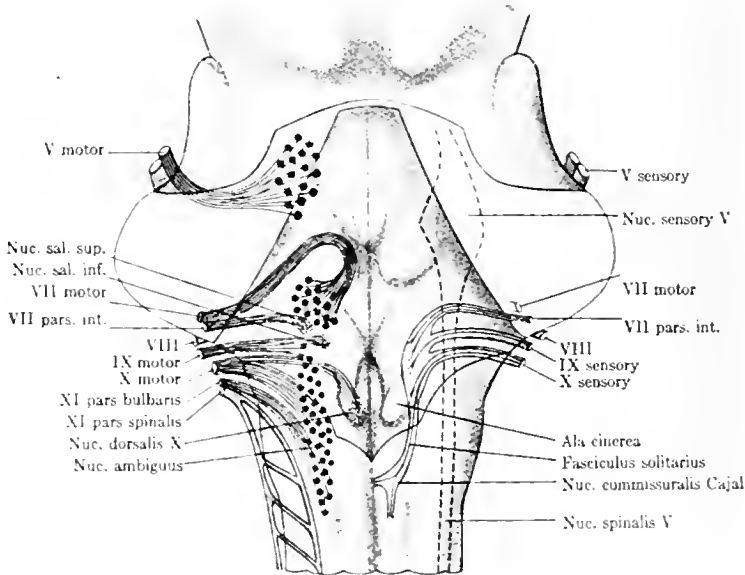


FIG. 1.—Diagram of the visceral afferent and efferent connections in the medulla oblongata. The afferent roots and centres are indicated on the right side; the efferent on the left. Visceral sensory fibres enter by the VII nerve (pars intermedia of Wrisberg, *VII pars. int.*) and by the IX and X nerves. These root-fibres include both general visceral sensory and gustatory fibres, all of which enter the fasciculus solitarius. (Fibres of the IX and X nerves also enter the spinal V tract; but since these are somatic sensory fibres from the auricular branch they are not included in the diagram).

On the left side of the figure the general visceral efferent nuclei are indicated by small dots, and the special visceral nuclei by large dots. The latter comprise the motor V nucleus for the jaw muscles, the motor VII nucleus for the muscles related to the hyoid bone and the general facial musculature, and the nucleus ambiguus supplying striated muscles of the pharynx and larynx by way of the IX and X nerves. Three general visceral efferent nuclei are indicated—the dorsal motor nucleus of the vagus under the *ala cinerea* and the superior and inferior salivatory nuclei. The superior nucleus (*nuc. sal. sup.*) supplies the sublingual and submaxillary salivary glands by way of the VII nerve (pars intermedia of Wrisberg), and the inferior nucleus (*nuc. sal. inf.*) supplies the parotid salivary gland by way of the IX nerve. All of the general visceral efferent fibres are preganglionic sympathetic fibres which end in sympathetic ganglia, whence post-ganglionic fibres carry the nervous impulses onward to their respective destinations.

(From *An Introduction to Neurology*, C. J. Herriek, 1916, p. 156.)

possible to account for all the findings. Involvement of the dorsally placed visceral vagus nucleus (tachycardia, vomiting, gastric hypersecretion), involvement of the adjacent sensory vagus nucleus (pain), of the fasciculus solitarius (taste), the nuclei salivatorii of Köhnstamm (salivation), and the glossopharyngeal and vagus nuclei (diminution of pharyngeal and absence of laryngeal reflexes), account for everything that the patient presents. It is possible that this group of symptoms and signs is produced by neuritis of the glossopharyngeal and vagus nerves. Without post-mortem examination it is impossible to be absolutely certain which of these hypotheses is correct. We incline to the idea that the process is central.

The nervous control of salivation by the autonomic originates in the nuclei of Köhnstamm which lie near the 7th and 9th nuclei.

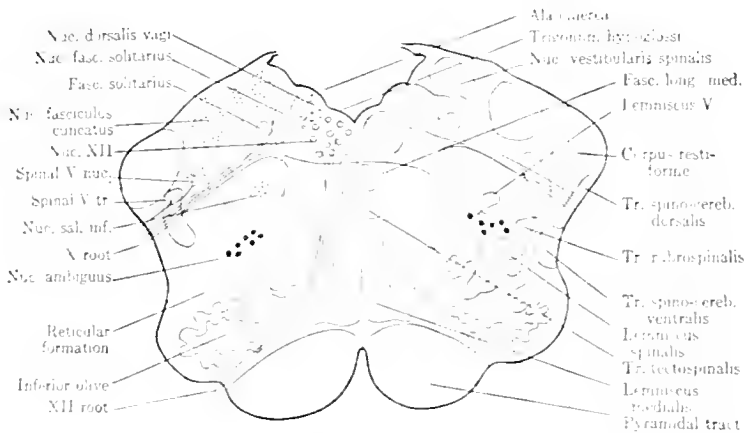


FIG. 2.—Diagrammatic cross-section through the human medulla oblongata at the level of the vagus nerve, illustrating details of functional localization.

(From *An Introduction to Neurology*, C. J. Herrick, 1916, p. 244.)

The position of the nuclei and the course of their fibres is indicated in the accompanying charts (*Figs. 1, 2, and 3*). The fibres controlling the stomach pass via the vagus and account for the gastric hypersecretion and vomiting. Except at the onset of the disease, the vomiting has always followed an attack of profuse salivation, and might be thought to be due to the filling of the stomach with a large amount of swallowed saliva. In view of the onset with gastric symptoms *unassociated* with salivation and the evidence of hypersecretion by gastric analysis, we feel that a secretion similar to that of the saliva occurs in the stomach. This and the vomiting are therefore separate manifestations, and occur more or less parallel to the salivation.

The tachycardia and the attacks of high blood-pressure are not easy to explain. Much has been written emphasizing the relation of high blood-pressure to gastric crises. However, from a recent piece of work at Dejerine's clinic by Heitz and Norero¹³ it is evident that no close relationship exists between these two manifestations. The rise in blood-pressure and the pain of gastric crises

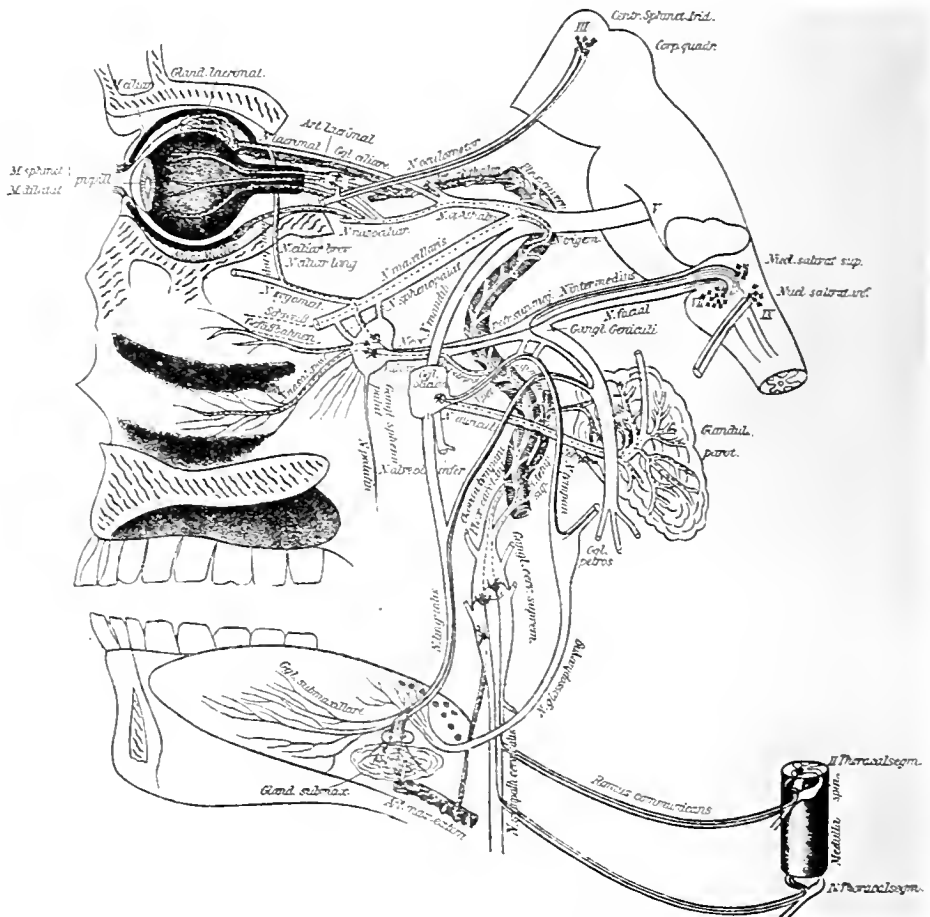


FIG. 63.—Schematic representation of the vegetative nerve innervation of the head. (Müller and Dahl.)

(From *Vegetative Neurology*, Heinrich Higer, 1919, p. 19. Nervous and Mental Diseases Monograph Series, No. 27. Translated by Walter M. Kraus.)

appear to be separate manifestations dependent upon a common cause rather than causally related to one another. There never was any abdominal pain or tenderness during the patient's attacks. However, pain behind the suprasternal notch has been present. In spite

of this fact, a rise of blood-pressure had not existed during all the attacks of pain, emphasizing the lack of any relationship. The cases reported in the literature include many of the signs and symptoms which we have described. In addition, associated involvement of the 5th nerve has been reported several times.

V.—CONCLUSIONS.

1. Crises occur in patients with syphilis of the nervous system who do not present the picture of tabes dorsalis.

2. A group of signs and symptoms due to disease of the pons and medulla or their nerves occurs in such cases of syphilis of the nervous system, and includes: (a) A profuse secretion of thin and watery saliva: (b) Gastric hypersecretion: (c) Attacks of vomiting related to salivation: (d) Tachycardia: (e) Attacks of high blood-pressure: (f) A sensation of bad taste in the mouth: (g) Pain in the suprasternal notch radiating downward to the left: (h) Diminution of pharyngeal and absence of laryngeal reflexes: (i) Disorders of sensation in the trigeminal distribution.

3. Whether the entire picture described be due to central or peripheral involvement remains to be decided. We incline to the former point of view.

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THE NATURE OF DESIRE.

BY ERNEST JONES, LONDON.

To judge from the history of science in general, it is highly probable that criticism emanating from other departments of knowledge will appreciably modify—and perhaps extensively so—the avowedly tentative formulations of psycho-analytic doctrine. To this statement a proviso must be added which is so self-evident that it should be unnecessary to mention it: experience, however, unfortunately shows that this is not so. The proviso is, of course, that the criticism must be both informed and unprejudiced. Up to the present, it must be admitted by any impartial onlooker that the amount of criticism of psycho-analysis with which this proviso is fulfilled is quite negligible in comparison with the volumes of the other sort. No one has regretted this state of affairs more than psycho-analysts themselves, who are keenly aware of the extent to which they need both criticism and assistance from workers in allied fields. It was, therefore, with a feeling of hopeful expectation, tempered perhaps by the memory of repeated disappointments in the past, that one read the opening passages in a recent editorial in the *JOURNAL OF NEUROLOGY AND PSYCHOPATHOLOGY*,¹ where a distinction was drawn between criticisms of psycho-analysis that are trivial and often based on prejudice, and those that are important.

Two criticisms based on Mr. Bertrand Russell's writings are mentioned. The first of these is not easy to answer, because it is expressed in such general and not explicit terms; the second one, which is clearer, will be dealt with presently. The summary given of the first is that "it is considered that (the new facts which have been discovered) should be capable of being understood without assuming the existence of a mythical entity endowed with anthropomorphic qualities". It is not specified what 'entity' is here referred to; but I take it to refer to Freud's conception of an intrapsychic censorship, for the simple reason that the identical phrase is used by Dr. Rivers in the dislike he expressed for this conception. I have not yet discovered any objection to it beyond a dislike of the word itself, a matter of the utmost unimportance. Freud found it to be a convenient term—one, however, which can at any moment be replaced by a more suitable one—to denote the sum total of the various inhibitions that may tend to prevent the free passage of mental

processes from one part of the mind to the other, notably from the unconscious to the conscious. I find it hard to imagine a conception more thoroughly in accord with all modern neurological physiology, a province in which similar conceptions are completely current, nor one to which one could less appropriately apply the terms of 'mythical' and 'anthropomorphic'. The very next sentence, however, made me doubt whether I had correctly understood the reference of the preceding one, for the editorial goes on to say, "It is obviously undesirable to personify so intangible a concept as the 'wish' or desire if it can be avoided". Here I must confess myself to be quite at sea, for, familiar as I am with Freud's writings, I can recall no single instance of his ever personifying a wish or desire. In consequence I remain uncertain about what the criticism really is.

In the same connection the following passage from Mr. Russell is quoted on the general question of 'desire': "Freud and his followers, though they have demonstrated beyond dispute the immense importance of unconscious desires in determining our actions and beliefs, have not attempted the task of telling us what an unconscious desire actually is, and have thus invested their doctrines with an air of mystery and mythology". Do we not see here the difference between a philosopher and a man of science? However much definite knowledge the latter may contribute on a subject, it is always open to the former to complain that the research has not revealed the 'inner nature' of the phenomena studied. A philosopher could thus sweep away the whole of neurology by saying, "But you have not told us what *is* the nervous system". One might have thought that if psycho-analysts "have demonstrated beyond dispute the immense importance" of something, they surely must have told us something about this thing, even though they may humbly admit that they have very much more to learn about it. In a new branch of science exact definitions are postponed as long as possible until a considerable body of knowledge has been accumulated, the reason being that observation and investigation are found to be more profitable occupations than the arid quibblings into which arguments about definitions so often degenerate.

In spite of this general consideration, however, an attempt may be made to meet the wishes of those who feel the need of a definition of desire. I take it that the word has two distinct connotations, which I shall venture to designate as the 'supernatural' and the 'naturalistic' respectively. In the former sense the word refers to a conception of some new idea, the elements of which have not previously existed, which is usually of an ethical or 'lofty' order; it is then thought that an organism is moved to act in a certain direction by the attracting force of this idea. In its second meaning a desire

is an appreciation by an organism, either as a whole or in part, of a sense of unrest or uneasiness due to psychical, and probably also neural, tension; this may or may not be accompanied by an appreciation of the kind of experience which would allay the unrest, or of the most suitable way to achieve this experience, but the attempts made to allay the unrest, i.e., to gratify the desire, are dictated by the discomfort of the tension. It need hardly be said that it is to this second meaning of the term that psycho-analysis, like the rest of psychology and neurology, subscribes. We would fully agree with the statement cited from Mr. Russell according to which "the thing which will bring a restless condition to an end is said to be what is desired".

So far I have not discovered in the editorial article any very definite difference with psycho-analysis. The second line of criticism proves to be equally unfruitful, because it is easily shown to be based on nothing but misapprehension. To quote from the article: "A consideration of desire as exhibited in animals makes it clear (and this is the essence of Mr. Russell's theory) that *unconscious desire is the natural and primitive form of desire*. Such a view would seem to differ fundamentally from those of Freud". Permit me to say quite simply that it does not; it is quite identical with Freud's own views. Mr. Russell himself seems to be under a similar misapprehension, for he is quoted as saying, "It is not necessary to suppose, as Freud seems to do, that every unconscious wish was once conscious." I am bound to say that it needs but a very cursory acquaintance with Freud's writings to know that he has never supposed anything of the sort. On the contrary, although, it is true, he considers that expulsion of an idea from the conscious into the unconscious *may* occur, he also considers that the most important of the unconscious wishes—important both for normal character-formation and for mental disorder—have *never been conscious*; furthermore, that when the expulsion just indicated does occur, it is probably always dependent on an association between the idea in question and one belonging to the latter group, to what he terms the 'primal repressed' (*Unverdrängte*).

It might not be out of place to expand this point by showing the resemblance between Freud's view of the unconscious and Mr. Russell's. Both agree that all wishes are primarily unconscious; Freud would go even further, and maintain that every single mental process is primarily unconscious. I do not think Mr. Russell explains clearly why some of these wishes subsequently become conscious and why some do not, but apparently he would not agree with the explanation given by Freud. According to Freud, there is an inherent, though very variable, tendency on the part of unconscious wishes to

strive forwards towards consciousness, a feature probably connected with the much greater control of emotivity, and especially of motor activity, associated with consciousness. An important group of these wishes is prevented from entering the conscious mind by the inhibiting action—working on the pleasure-pain principle—that is associated with their incompatibility, largely on moral and æsthetic grounds, with conscious elements. Freud's conception of the unconscious is thus wider than his conception of repressed material: it includes the latter, but is not co-extensive with it.

The readers of this journal may judge of the extent to which the criticisms here considered belong to the category of informed criticism.

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[In the course of his paper Dr. Ernest Jones states that he is unable to discover in our editorial any very evident difference with psycho-analysis. If he had done so, the article would have incorrectly represented Mr. Russell's views, as these are, broadly, in harmony with those of Freud. Mr. Russell takes a similar objective attitude to the human being to that of Freud: he recognizes that consciousness is not the essence of life and mind: and he makes it clear that individuals tend to be habitually unaware of the real nature of their desires. The divergence of views consists mainly in the language in which desire is described: Mr. Russell exhibits it as "a causal law of our actions", and "not as something existing in our minds" after the manner of Freud. Furthermore, the language in which Freud expresses his conception of unconscious desire is of such a character that the 'unconscious' tends to be spoken of as if it were a personality with similar attributes to the conscious personality, with the exception of consciousness. Hence our observations on the personification of desire to which Dr. Jones takes exception. As regards the misapprehension to which Dr. Jones refers in the latter part of his paper, we are inclined to think that this is shared by a number of students of psycho-analytical literature. It is true that Freud makes the statement referred to in his recent lectures, and that he has always held that *some* unconscious wishes may never have been conscious: but the impression gained from the perusal of authoritative works on psycho-analysis is that the primitive impulses in childhood, to which Freud attaches so much importance for character formation, are at one time conscious and become repressed early in life. We drew the attention of our readers to Mr. Russell's work because we regarded it of great importance to theoretical psychology. Those who read this work will be able to judge for themselves the value or otherwise of the views expressed therein.—ED.]

Short Notes and Clinical Cases.

CASE OF INFLUENZAL MENINGITIS: RECOVERY AFTER REPEATED LUMBAR PUNCTURE.

By GEOFFREY HADFIELD, BRISTOL.

A SCHOOLBOY, A. M., age 14, was admitted to the General Hospital, Bristol, under the care of Dr. Carey Coombs, on Jan. 26, 1922, complaining of headache and vomiting.

Fourteen days before admission he had a severe cold and headache which confined him to bed for two days. He was up during the next two days, feeling fairly well. About this time he hit his head against a post, and developed severe headache and vomiting. The latter symptom increased in severity; he could take no food, and became febrile. The doctor attending him diagnosed meningitis, and he was admitted to hospital. He had always been healthy previous to the present illness. There was nothing of note in his family history.

ON ADMISSION.—Patient was quite conscious. Temperature 100°, pulse 60, respiration 20. Complained of pain, referred to frontal and occipital regions. Marked photophobia. Head was held slightly extended on trunk, and posterior cervical muscles were very definitely rigid. All superficial and deep reflexes were present and normal. Plantar reflex, flexor. Pupils were dilated, reactions normal. Kernig's sign was positive. Optic discs, normal. Organs of chest and abdomen, normal. Lumbar puncture was performed on the day of admission; the fluid was under pressure. It showed a slight general turbidity (corresponding roughly to a suspension of 500 million *B. typhosus* per c.c.). The turbidity was due to a uniform suspension of fine white particles. On standing it deposited a voluminous, delicate, pearl-grey clot. It contained 2200 cells per c.mm. Of these, 85 per cent were polymorphonuclear leucocytes, 10 per cent were lymphocytes, and 5 per cent were large mononuclear cells. No organisms were seen in films. No tubercle bacilli were found after repeated examinations. Four blood-agar plates inoculated heavily with the deposit grew five colonies of an organism indistinguishable

from *B. influenzae*. There was no growth on plain nutrient agar, inspissated serum, or serum agar. The course of the disease will be seen from the following temperature chart:—

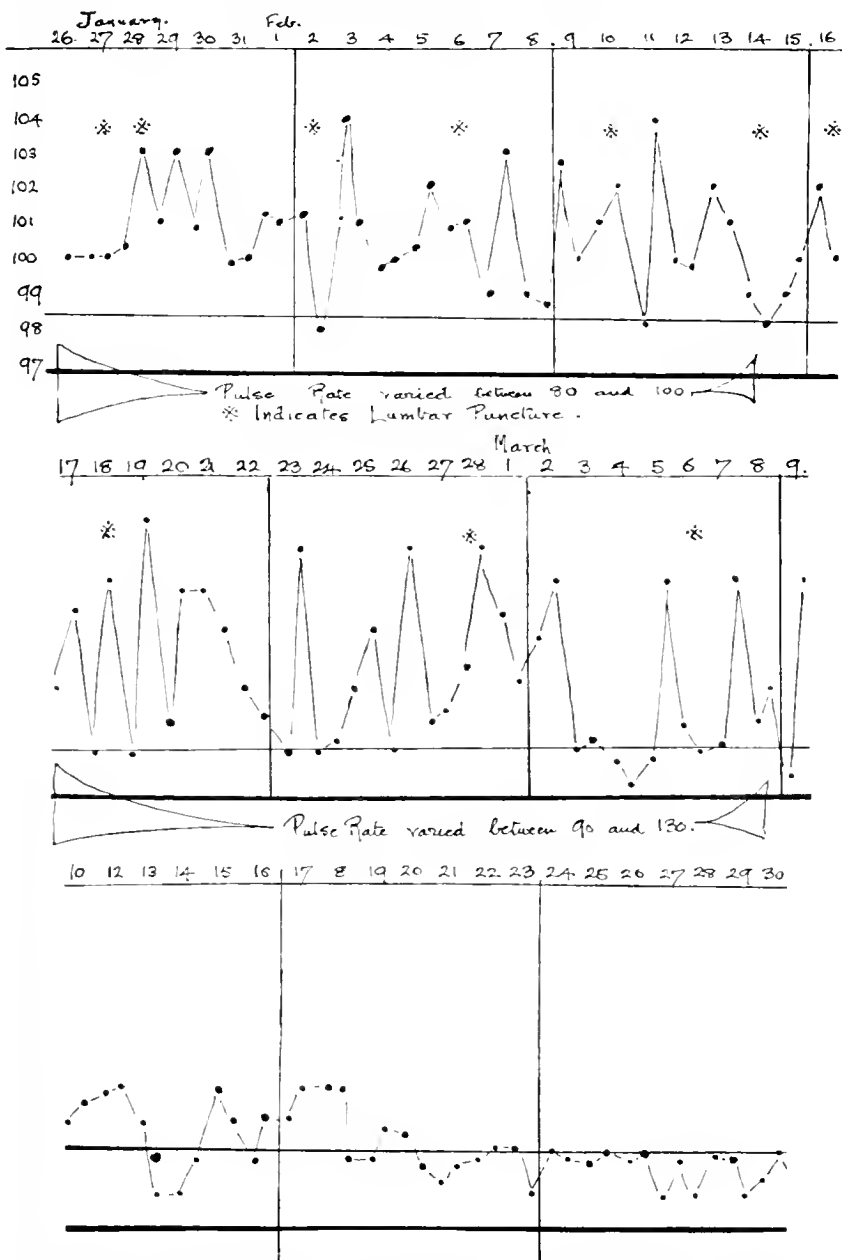


FIG. 1.—Temperature chart showing course of the disease and the effect of repeated lumbar punctures.

The temperature often started rising about 2 p.m., reaching a maximum about 6 p.m., when it would often begin to fall. Meningeal symptoms were present until March 9, and were greatly exaggerated during the bouts of high temperature. When the temperature was high there was intense photophobia, severe headache, neck rigidity, and dulling of consciousness. The room had to be darkened for the first symptom, and the boy was terrified lest his visitors should raise the blind. When the temperature fell, and until it again began to rise, an extraordinary amelioration of all symptoms took place, only the neck rigidity persisting to any extent. The cerebrospinal fluid withdrawn on Feb. 16 was less turbid than on the first occasion, but a fairly copious growth of *B. influenzae* was obtained on blood media.

Meningeal symptoms had disappeared entirely by March 21, and recovery was apparently complete in every way.

In this connection the fact that the patient was treated by lumbar puncture frequently repeated (*see Chart*) is worthy of notice.

SPIROCHÆTOSIS OF THE CEREBRO-SPINAL FLUID.

By D. O. RIDDEL AND R. M. STEWART, WHITTINGHAM.

In the period which has elapsed since Noguchi first demonstrated the *Sp. pallida* in the brain of general paralytics, a considerable volume of information has accumulated on the distribution and activity of the parasite within the nervous system. On the other hand, very few reports have been made on the results of search for spirochaetes in the cerebrospinal fluid, although the question of their presence there is a subject of more significance than the literature would indicate.

Whatever may be the precise relationship of the cerebrospinal fluid to the brain parenchyma, all investigators are agreed that the two are intimately connected, and it might well be assumed that when *pallida* are present in the nervous system they must exist in the spinal fluid also. It may be that the significance of this relationship has not escaped notice by the pathologist; yet the fact remains that very little in the way of systematic search appears to have been carried out, although at various times it has been found possible to prove the presence of the organism by animal inoculation with cerebrospinal fluid.

Dunlap,¹ in an excellent review of recent studies on spirochaetes in general paralysis, states that they have lately been found by Jahnel in the aorta, and also in the meninges, and he emphasizes the fact that they "have never been seen with the microscope in either blood or fluid except as a possible post-mortem migration into the blood". Several observers have, however, found spirochaetes in the spinal fluid in other conditions, though never, so far as we have been able to discover, in large numbers. One of the earliest records of their presence is that of Dohi and Tanake,² who found them in the spinal fluid from a case of secondary syphilis where there was no involvement of the nervous system. At a later date Gaucher and Merle³ reported the presence of spirochaetes in ventricular fluid removed post mortem, and in 1910 S  zary and Paillard⁴ found a single spirochaete in the fluid of a case of secondary syphilis. Their patient was a man, age 33, with a papular skin eruption. He developed a total left hemiplegia, and was comatose when lumbar puncture was performed. The spirochaete was actively motile, regular, and of a

very slender thickness. This appears to be the first recorded case of spirochaetal infection of the cerebrospinal fluid in neurosyphilis, and we have been unable to find any other references to this subject in the post-war literature.

It is obvious that until the distribution of the spirochaete in general paralysis has been completely worked out, we are not likely to solve the question of how spirochaetes gain access to the brain, and it was a knowledge of this defect that led us to undertake last year a systematic search for their presence in the cerebrospinal fluid. In this communication we propose to give a brief résumé of our results up to the present.

Methods.—For the detection of spirochaetes we relied on examination of the fluid with a microscope fitted with a dark-ground condenser.* Search was always made at the earliest opportunity after lumbar or cisternal puncture, and examination of a drop of uncentrifuged fluid was followed up with cover-slip preparations of the deposit after centrifugalization. The chances of finding spirochaetes are probably less than when centrifuged fluid is used; but we believe that there is a possibility of so fragile an organism being destroyed during the process, and for this reason we never ran the centrifuge at a high speed.

When living spirochaetes were detected in the above way, permanent preparations were made on slides, the fluid being spread in an even film and allowed to dry in the incubator. Of the staining methods devised for demonstrating the organism, we employed either the Giemsa stain or the Fontana-Tribondeau silver process. Films stained by the first method show fewer distortions of the parasite, probably because heat is not essential; but in Fontana's method the hot reagents cause artefacts which interfere with the shape and regularity of the organism. Moreover, we found that in silver-stained preparations the spirochaetes always showed an exaggerated thickness. We also succeeded in staining spirochaetes by first impregnating the deposit by Jalmel's method⁵ and then embedding in wax. In this way very fine sections were obtained, showing the pallida in enormous numbers.

Material and Results.—The spinal fluids of 23 cases of general paralysis were used in this investigation: 7 acute cases, and 16 sub-acute or chronic. Included in the series were 3 cases of juvenile paresis.

The results were entirely negative save in one case, so that it will be unnecessary to give a detailed account of the whole series.

* The apparatus used for this investigation was supplied by the Medical Research Council, for whose assistance we wish to express our gratitude.

The only positive result was obtained with the fluid of a juvenile paretic, which showed spirochaetes in enormous numbers.

The following is a report of the clinical and laboratory findings:—

CLINICAL HISTORY.—E. M. E., age 20, a card-room hand, was admitted to the Whittingham Mental Hospital on June 19, 1922. Her certificate stated: "She is confused in speech, and is constantly removing her night-dress, saying it is wet—this is a delusion. Walks about the ward in a nude condition. Passes urine on the floor."

FAMILY HISTORY.—A paternal grandmother of the patient died insane—cause not known. Her father died in an asylum from general paralysis of the insane in 1913. The mother, now an apparently healthy woman, suffered from epilepsy in childhood, and had several still-born children before the birth of E. M. E. and one other daughter.

PERSONAL HISTORY.—The patient cut her teeth at 8 months, commenced to walk at 14 months, and to talk at 18 months. In infancy she had measles and bronchitis, but became a fairly robust child. Menstruation did not commence till the age of 18, and was irregular. She was a sober, industrious, quiet, and hard-working girl; reached Standard 7 at school, and earned £2 a week as a card-room operative.

PRESENT ILLNESS.—In June, 1921, she was out of work, and about this time her articulation commenced to be faulty and her gait uncertain. In October, 1921, she was placed under medical treatment, and in April, 1922, her mental state became so bad that she had to be removed to the workhouse infirmary.

State on Admission.—The patient was a pleasant-looking girl, 5 ft. 2 in. in height, of normal development, and with no obvious manifestations of congenital syphilis. The upper central incisors, though not notched, were slightly peg-shaped. Her thoracic and abdominal organs were normal. Her pupils were unequal, irregular, and sluggish in their reaction to light. The knee-jerks were diminished; other reflexes normal. Articulation was slightly slurring, and gait unsteady. There was no facial tremor, but slight continuous involuntary movements affecting the flexors of the left upper limb were noted. On admission she was confused, restless, and paid little or no attention to questions. Very soon she became more confused, resistive, and destructive. Her habits became very faulty, and she had to be kept permanently in bed. The articulatory defect became more obvious, and teeth-grinding was a prominent feature. After the lapse of several weeks she quieted down, and spent much of her time singing and looking at pictures. The involuntary movements of a clonic type persisted. In September she was too weak to stand or walk, and had an irregular pyrexia which was found to be caused probably by a *B. coli* infection of the urine. She emaciated rapidly. Throughout the period of observation she was extremely emotional, either laughing and smiling, or weeping profusely. Towards the end of the year there was a considerable degree of dementia. Since this date there has been very little change.

Laboratory Findings.—The Wassermann reaction was positive in the blood on Sept. 1, and positive in the cerebrospinal fluid on two occasions (Sept. 12 and Nov. 27). Her sister, E. E., gave a negative reaction, but the mother's blood was strongly positive. The patient's blood was twice examined for spirochaetes, with negative results.

The following table shows the cerebrospinal-fluid findings:—

TABLE SHOWING RESULTS OF EXAMINATION OF THE CEREBROSPINAL FLUID OF E. M. E.

DATE	SITE OF PUNCTURE	COLLOIDAL GOLD TEST	COLLOIDAL GAMBOGE TEST	CELL- COUNT	ROSS-JONES TEST	SPIROCHÆTA PALLIDA
28 6 '22	LP	5555543200	222220	44	+	+
6 7 '22	LP	5555554322	222210	—	+	+
9 7 '22	CP	5555554322	222210	63	+	+
22 7 '22	LP	5555555543	222110	279	+	+
23 7 '22	CP	5555555554	222220	119	+	+
8 8 '22	CP	5555555420	—	89	+	+
15 8 '22	CP	5555555320	222210	81	+	—
20 8 '22	CP	5555555310	222220	24	+	—
25 8 '22	CP	—	—	9	+	—
1 9 '22	CP	5555532000	222110	7	+	—
9 9 '22	CP	5555554320	222110	10	+	—
9 9 '22 (midnight)	LP	5555554432	222210	13	+	—
18 9 '22	CP	5555410000	222210	5·3	+	—
22 10 '22	LP	5555554332	222220	12	+	—
6 11 '22	CP	5554331000	222210	2	f. +	—
15 11 '22	CP	5554410000	222110	3	f. +	—
23 11 '22	CP	—	—	2	f. +	—
3 12 '22	LP	5555421000	222210	3	+	—

LP=lumbar puncture. CP=cisternal puncture. f. + = faintly positive.

Comment.—It will be seen that spirochaetes were discovered on the first occasion on which lumbar puncture was performed (June 28), and were also found on five subsequent dates (July 6, 9, 22, 23, and Aug. 8). On Aug. 15 none were found, and all further examinations were negative. It therefore seems fair to assume that during a period of at least forty-one days spirochaetes were constantly present in the cerebrospinal fluid, and that thereafter they disappeared entirely. It should also be noted that during the period in which they were present there was no cytological or serological peculiarity of the cerebrospinal fluid to suggest their presence. The cell-count lay within normal limits for this class of case, save on one occasion when it jumped from 63 to 279 cells. At first we thought it possible that a high cell-count might indicate an invasion of the cerebrospinal fluid by spirochaetes, but a study of other fluids showed that lymphocytes and plasma-cells may be present in very large numbers in fluids which contain no spirochaetes. Whether the converse holds—a low cell-count with a spirochaetosis—is a question which we are unable to answer, but it is worth noting the very rapid fall in cell-count which followed the disappearance of the organisms in this case.

We are inclined to attribute both the improved mental state and the slow and progressive reduction of cell and globulin contents to the repeated removal of fairly large quantities of cerebrospinal

fluid, and possibly the abrupt disappearance of the spirochaetes may have been connected in some way with the spinal drainage.

On twelve occasions we performed puncture of the cisterna magna, for we found that fluid removed from this locality contained more spirochaetes than the lumbar fluid. A rough estimate of the total number of spirochaetes in films prepared from the cisternal and lumbar fluids showed a striking difference. Thus, on July 6 only three spirochaetes were found in a stained lumbar film, whereas three days later fifty-four were counted in a drop of equal volume of cisternal fluid, and it seems hardly likely that the difference could be due to a pullulation of spirochaetes in the two days which intervened between the punctures.

Attempts were made to cultivate the organism, and for this purpose we employed Noguchi's agar-tissue medium,⁶ Muhlens and Hoffmann's horse-serum agar,⁷ and a medium prepared by using equal parts of hydrocele fluid and the patient's cerebrospinal fluid. In spite of strict anaerobic conditions, the results were uniformly negative. Arrangements were then made for animal inoculation, for, as we were dealing with a heavily-infected fluid from a juvenile paretic whose father had succumbed to general paralysis, it seemed an excellent opportunity of repeating the work of Levaditi and Marie,⁸ who believe in the existence of a neuropathic strain. Unfortunately the unexpected disappearance of the organism put an end to this part of our investigation.

As the *Spirochata pallida* appears to be distributed in enormous numbers throughout the body in congenital syphilis, their discovery in the cerebrospinal fluid from a case of juvenile paresis suggested that an infection of the cerebrospinal fluid might be a distinctive feature of this form of dementia paralytica; but such does not appear to be the case, for we were unable to find any spirochaetes in two other cases.

Morphology.—Under dark-ground illumination the spirochaetes appeared actively motile, moving rapidly across the field, and exhibiting the typical corkscrew movement. For the most part they varied extremely little in form, twelve being the average number of spirals, all perfectly regular, well marked, and closely resembling each other. Occasionally very much longer forms were seen, and these gave the impression of being rather more slender than the shorter forms. Movement continued for as long as six hours, although actual translation across the stage usually ceased in two or three hours. We had no means of preserving a uniform temperature of the microscope stage, but the heat generated by the Liliput arc lamp was sufficient to prevent the slides from becoming cold. In cerebrospinal fluid preserved in the incubator at 37° C. under ordinary aerobic conditions.

the spirochaetes continued to show movement for twelve days after withdrawal of the fluid. At no time were we able to observe evidence of longitudinal division.

Another interesting feature was the presence of peculiar round bodies. These, frequently terminal or attached to one side of the organism, were in size not very much greater than the transverse diameter of the pallida. Their refractive power appeared to be higher than that of the body of the organism, and gave the impression of a brilliant 'head lamp' as the spirochaete moved rapidly across the field. Noguchi⁹ has also remarked the presence of similar spore-like bodies, whose significance is quite unknown. Long after the

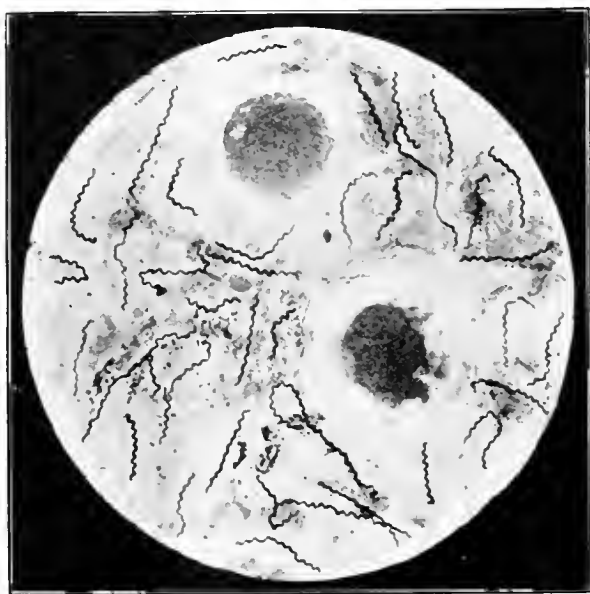


FIG. 1.—*Spirochata pallida* in cerebrospinal fluid. Fontana stain ($\times 1200$). Two cells are seen, one a lymphocyte and the other a polymorph.

disappearance of spirochaetes we found minute spherical bodies indistinguishable from those attached to the pallida.

In stained films very similar morphological characters were observed: but the spirals were often irregular and somewhat flattened out, as though the organisms had become stretched in the process of staining.

It was an easy task to count as many as 100 pallida in a drop of uncentrifuged cerebrospinal fluid $\frac{1}{12.5}$ c.c. in volume. (We used Donald's¹⁰ drop-method of counting.) The illustration accompanying this paper (Fig. 1) was obtained by taking separate microphotographs

of some forty spirochaetes from a single film preparation: the prints were then rephotographed to give a composite picture, and we would like here to acknowledge our indebtedness to Mr. A. H. Fann, Chief Laboratory Assistant at the Whittingham Mental Hospital, who prepared the illustration.

SUMMARY.

The spinal fluids of 23 cases of general paralysis were examined for the presence of *Sp. pallida*. Twenty-two fluids were negative: but in one, obtained from a case of juvenile paresis, enormous numbers were found. Their presence in the cerebrospinal fluid was verified on six consecutive occasions, which covered a period of forty-one days. Thereafter they disappeared, and could not be again identified, although twelve more punctures were performed. Attempts at cultivation were unsuccessful, but the motility of spirochaetes preserved *in vitro* was retained for twelve days.

Fluid removed by cisternal puncture contained more pallida than were seen in lumbar cerebrospinal fluid. Peculiar spore-like bodies attached to the ends or sides of the organisms were seen with the aid of dark-ground illumination, and similar bodies continued to exist in the fluid when the spirochaetes had completely disappeared.

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Editorial.

THE LOCALIZATION OF INTRACRANIAL TUMOURS.

Up to the year 1870 almost nothing was known of cerebral localization of function, the generally accepted view being that of Flourens, who taught that the cerebrum is a homogeneous mass, and that symptoms resulting from cerebral lesions are proportional to the amount of brain tissue lost. An entirely new field of study was inaugurated by the chance observations of an army surgeon on the battle-field. Fritsch, whilst operating upon a wounded soldier, applied the galvanic current to the exposed surface of the brain, and observed twitching of certain muscles. Further pioneer work, undertaken in collaboration with Hitzig, furnished conclusive proof of the error of the view then prevalent that the cerebral hemispheres are not excitable by any known stimulus. Their discovery was immediately followed by an immense number of experimental researches which in general have given concordant results, and the fruitful labours of Horsley, Ferrier, Sherrington, and a host of other workers have made the subject of brain function so familiar that to-day it is difficult to realize what a revolution in medicine cerebral localization has made. Although the widely accepted view that particular functions are localized in certain definite cortical 'centres' cannot withstand criticism, the acceptance of a cerebral localization of symptoms has proved of great clinical value, and been responsible for much progress in the surgery of the nervous system. It needs but a small acquaintance with the literature to realize the rapid growth of brain surgery in the last fifty years, especially in relation to operative procedures for the removal of intracranial neoplasms.

Decompressions in cases of brain tumour were at first purely palliative in character, the trephine being employed solely for the relief of pressure or other urgent symptoms. The honour of being the first to open the skull as a palliative procedure is shared by Horsley and Durante, although Annandale in 1894 stated that more than twenty years previously he had trephined the skull of a patient whose symptoms were those of general brain pressure.

With the development of improved methods of technique the surgeon next ventured to undertake an operation which aimed at the removal of the neoplasm, provided it was situated in the more accessible regions of the hemisphere. The early results were disheartening, and served to damp the enthusiasm excited by the application of cerebral localization to surgery. In recent years, however, newer methods of approach and earlier interference have done much to reduce the high case-mortality, and at the present day tumours are successfully removed from almost every part of the brain. Indeed, it would almost appear that we have reached a phase in which operative procedures are in advance of the methods of diagnosis. It seems very nearly incredible that an intracranial neoplasm may grow to the size of one's fist and yet evade accurate localization: but probably few neurologists have escaped the chagrin of observing such cases. All that it may be possible to say in the absence of focal symptoms is that a tumour is situated in one or other hemisphere, or, more vaguely still, that it is confined to the supratentorial region. It is particularly when the growth infiltrates or destroys one of the many 'silent' areas of the brain that difficulties arise. Moreover, the physician is occasionally misled by a remarkable absence of signs of localizing value when the tumour occupies an area whose function is known. Still another source of complexity arises when local signs are late in making their appearance, or when the patient is seen for the first time at a late stage of his illness, for, under such conditions, symptoms due to derangement of function in parts of the brain at a distance from the tumour may suggest a localization which in no way reflects the true state of affairs.

It follows from what has just been said, that while the presence of an intracranial tumour can usually be readily diagnosed it may be difficult or impossible to determine its exact locality. This occasional failure of ordinary neurological methods has naturally led workers to seek other means of approach. Puncture and aspiration of the brain through the skull was practised many years ago; but inasmuch as one puncture seldom sufficed, the procedure has been abandoned. The use of the tuning-fork has also found adherents. The presence of a tumour close beneath the skull-cap lessens bone conductivity, and if the vertex is struck by a tuning-fork its note may fail to be conducted in the neighbourhood of the lesion. The value of the Röntgen ray for diagnostic purposes has also proved disappointing, it being the exception rather than the rule for a tumour to cast an abnormal shadow, and few surgeons would care to risk a diagnosis upon its indications.

Quite recently, however, it has been found possible to utilize radiography in a manner which we imagine will be new to many of

our readers. For the purpose of localizing or eliminating tumours in areas above the tentorium cerebelli, Dandy¹ has employed the Röntgen ray after the fluid contents of the cerebral ventricles have been removed and replaced by air. The introduction of air allows a very clear outline of the cerebral ventricles to be obtained, and it is, of course, evident that a tumour of any size situated in either cerebral hemisphere will modify the shape, size, and position of the corresponding lateral ventricle. The method, which Dandy calls 'ventriculography', has been employed by its inventor in more than 75 cases, and in 5 instances the 'ventriculogram' allowed precise localization of the tumour in the absence of all other localizing signs. In one instructive case in which two exploratory operations had failed to reveal the tumour, x-ray examination after an intraventricular injection of air permitted accurate localization. The anterior horn and the anterior portion of the body of the left lateral ventricle were almost exactly like the corresponding parts of the right ventricle, but no air had reached the posterior and descending horns: these portions of the left ventricle, therefore, threw no shadows and were absent in the röntgenogram. Craniotomy was performed, and a large encapsulated tumour removed from the ependymal lining of the left descending horn. Two years after the operation the patient was perfectly well and at work.

This method of localization possesses the disadvantage that it involves the necessity of making a preliminary opening in the skull to allow the introduction of air, and the formidable risks which at present attend its use do not permit its recommendation as a routine procedure. Nevertheless, the available evidence appears to justify the conclusion that ventriculography possesses great possibilities of clinical application, and places in the hands of the neurologist a new aid to diagnosis which promises still more brilliant achievements in the field of neurological surgery.

REFERENCE.

- ¹DANDY, W. E., "Localization or Elimination of Cerebral Tumours by Ventriculography", *Surg., Gynecol. and Obst.*, 1920, xxx, 329.

Abstracts.

Neurology.

NEURO-ANATOMY AND NEUROPHYSIOLOGY.

- [100] **A study of sinistrality and muscle co-ordination in musicians, iron-workers, and others.**—CLARENCE QUINAN. *Arch. of Neurol. and Psychiat.*, 1922, vii, 352.

THE word sinistrality is used by Quinan to designate partial as opposed to established left-sidedness. Having adopted the view that the disorders of speech so often noted in left-handed people are due to congenital inferiority of the nervous system, the author proceeded to look for evidence of muscle inco-ordination in 16 sinistral individuals. Six admitted an unaccountable and capricious tendency to 'bump into things'. One was unable to 'reverse' in waltzing. Of 5 who had studied instrumental music, 2 had made fair progress up to a certain point, but considered that they had accomplished little for the outlay of time and money. Both were hampered by a defective sense of tempo and found 'sight-reading' an embarrassment. Two others abandoned the study of music because they were unable to make any headway. The remaining one was a talented player, but stated that she found it difficult to keep in time. Of these 5 musicians, 2 were left-handed and left-eyed (dominance of the left eye in binocular vision), 1 was left-handed and right-eyed, and 2 were right-handed and left-eyed. The remaining 5 patients were free from motor symptoms. A study of these cases seemed to show: (1) That sinistrals are especially prone to various forms of muscle inco-ordination, and (2) that in some of these persons both the sense of equilibrium and the sense of rhythm are defective.

With a view to obtaining further data, Quinan next studied sinistrality in three series of 100 men each, classified as (1) professional musicians, (2) machinists, and (3) male inmates of a public relief house. Four per cent of the machinists proved to be left-handed, and an additional 4 per cent had sinistral peculiarities. In striking contrast to these figures, 8 per cent of left-handedness was found in the series of musicians, while the lesser forms of sinistrality reached the remarkable total of 24 per cent.

It was noted in this research that the left-handed and sinistral musicians were much more nervous and 'temperamental' than the dextrals, and the conclusion is drawn that left-handedness and sinistrality usually are indicative of the psychopathic constitution.

R. M. S.

- [101] **Experimental alteration of brain bulk.**—L. H. WEED and P. S. McKIBBEN. *Amer. Jour. Physiol.*, 1919, xlviii, 531.

INTRAVENOUS injection of a hypertonic solution (30 per cent NaCl or saturated NaHCO_3) is followed by a marked decrease in size of the brain; when the skull is opened, the brain may be seen to fall away several millimetres from the inner surface of the skull after such injection. Intravenous injection of a hypotonic solution (water) causes a marked swelling of the brain; when openings are made in the skull, the brain will rise, forming tense herniae protruding several millimetres through the trephine openings. These changes are independent of the volume of the fluid injected, and are probably due to fundamental osmotic effects of the hypotonic and hypertonic solutions.

The brains of old cats fail to respond readily to intravenous injection, particularly to the intravenous injection of hypotonic solutions. Internal changes, recognizable histologically, have been found quite constantly in the brains of animals which have been given intravenous injections of hypertonic or hypotonic solutions, and which have not been trephined. On the contrary, in animals in which the skull is opened and the brain thus allowed to change its volume freely, these histological changes have not been demonstrated.

These findings lead one to assume that the cranial cavity is relatively fixed in volume and is completely filled by brain, cerebrospinal fluid, and blood; variations in any one of the three elements may occur, compensation being afforded by alteration in the volume of one or both of the remaining elements.

R. M. S.

- [102] **Pressure changes in the cerebrospinal fluid following intravenous injections of solutions of various concentrations.**—L. H. WEED and P. S. McKIBBEN. *Amer. Jour. Physiol.*, 1921.

Systemic effects of the intravenous injection of solutions of various concentrations, with especial reference to the cerebrospinal fluid.—L. H. WEED and W. HUGHSON. *Amer. Jour. Physiol.*, 1921, lviii, 53.

THE intravenous injection of relatively large amounts of Ringer's solution causes a temporary rise in the pressure of the cerebrospinal fluid and in the brachial venous pressure; both quickly return to normal levels. Arterial pressure is usually reduced during the period of injection, and remains at a slightly lower level than that shown initially.

The intravenous injection of a hypotonic solution (distilled water) causes a prolonged increase in the pressure of the cerebrospinal fluid. This increase in pressure is accompanied by an increase in brachial venous pressure of far smaller degree and of shorter duration. Arterial pressure rises slightly in response to such injections.

The intravenous injection of strongly hypertonic solutions causes a prolonged and profound fall in the pressure of the cerebrospinal fluid, preceded usually by a sharp rise. The brachial venous pressure increases markedly during the period of injection, and then falls rapidly to maintain

a new level, usually slightly below the normal. Arterial pressure is lowered during the period of injection, but recovers to a level somewhat higher than the initial.

Cerebrospinal-fluid pressure is invariably higher than that of the brachial vein, except after the intravenous injection of strongly hypertonic solutions.

The changes in cerebrospinal-fluid pressure induced by the intravenous injection of solutions of various concentrations seem to be independent of the changes in the systemic or venous pressures.

R. M. S.

- [103] **The cerebrospinal fluid in relation to the bony encasement of the central nervous system as a rigid container.**—L. H. WEED and W. HUGHSON. *Amer. Jour. Physiol.*, 1921, lviii, 85.

REPEATED intravenous injections of strongly hypertonic solutions fail to reduce the pressure of the cerebrospinal fluid to negative values in animals in which the bony skull over one cerebral hemisphere has been removed. Negative pressures of the cerebrospinal fluid are obtained by intravenous injections of strongly hypertonic solutions in animals in which the opening through the skull has been subsequently sealed; under these experimental conditions, opening of the cranium by removal of the sealing device causes an immediate rise in the pressure of the cerebrospinal fluid to positive readings. These findings indicate that the bony coverings of the central nervous system constitute, within tested physiological limits, inelastic and rigid containers; the ordinary physical laws of a 'closed box' may therefore be applied to the cranium.

R. M. S.

- [104] **Intracranial venous pressure and cerebrospinal-fluid pressure as affected by the intravenous injection of solutions of various concentrations.**—L. H. WEED and W. HUGHSON. *Amer. Jour. Physiol.*, 1921, lviii, 101.

THE alterations in the pressure of the cerebrospinal fluid, effected by the intravenous injection of solutions of various concentrations, are in large part independent of the alterations in the intracranial arterial and venous pressures. The pressure of the cerebrospinal fluid, while dependent in part upon cerebral arterial pressure and in large measure upon cerebral venous pressure, is independent of either.

The pressure of the cerebrospinal fluid, in the etherized animal under constant experimental conditions, is practically always higher than that of the superior sagittal sinus. This relationship holds during alterations in pressures effected by the intravenous injection of isotonic and hypotonic solutions; it is reversed after the intravenous injection of strongly hypertonic solutions. Alterations in the intracranial venous pressure effect changes in the pressure of the cerebrospinal fluid, in the same direction but not to the same extent. Within certain physiological limits, changes in pressure of the cerebrospinal fluid brought about by the intravenous injection of solutions of various concentrations, effect changes in the cerebral venous pressure as measured in the superior sagittal sinus. A marked

correspondence between venous pressures as determined in the superficial brachial vein and in the superior sagittal sinus seems demonstrated; the exact levels of the two pressures are modified by the local conditions of their situation.

R. M. S.

NEUROPATHOLOGY.

- [105] On the pathogenesis and treatment of tabes dorsalis and general paralysis.—L. B. ALFORD. *Amer. Jour. Syph.*, 1922, vi, 410.

This short paper purports to be "a discussion of the pathogenesis of tabes dorsalis and general paralysis with a view to the bearing on treatment." The subject is one which deserves much fuller treatment than is possible in the six pages devoted to it by the writer. In fact, no fair summary could be made of the various theories extant for the origin of either disease alone in a paper of this length. As it is, we are given only one theory of the pathogenesis of tabes, that of Obersteiner and Redlich, and this is but lightly touched on. In connection with this we are told that the nerve roots lose their "neurilemmal or connective-tissue sheath" on piercing the pia mater. This is quite true: but it is also true that they lose their neurolemmal sheath or sheath of Schwann at or near the same situation, and it is on the latter point that Orr and Rows and other writers lay stress.

With regard to general paralysis, we are told that the spirochaetes "are certainly not co-extensive with the distribution, or in proportion to the severity, of the anatomical changes". In support of this the writer quotes a case which both in its serological and histological aspects resembles cerebral vascular syphilis much more closely than general paralysis.

The vexed question of the relation of the cerebrospinal fluid to the nerve centres is dismissed in a few lines. The writer mentions the work of Mott on this subject, but does not state the means whereby he succeeded in making coloured solutions pass from the subarachnoid space into the tissues of the cerebral cortex. He adds "that others believe that experiment alters relations, and that normally the flow is in the opposite direction".

The relation of these theories to the treatment of neurosyphilis is dismissed in the same brief manner. We do not agree with the writer that present methods "aim too much at the destruction of the parasite", although we cordially endorse his view that they give results far short of the ideal. But syphilologists cannot improve their technique in the treatment of neurosyphilis without a knowledge of the main facts and theories concerning the pathogenesis of the disease, and we cannot think that this paper supplies the deficiency.

J. G. GREENFIELD.

- [106] The excretion of *Spirochæta pallida* through the kidneys.—A. S. WARTHIN. *Jour. of Infect. Dis.*, 1922, xxx, 569.

AN important paper in which Warthin demonstrates that the elimination of the organism of syphilis may take place under the same conditions, and apparently with the same mechanism, as described for the spirochaeturia of infectious jaundice. In three cases of congenital syphilis studied—one of a child dying at birth, another dying eight days after birth, and the

third at three and a half years of age--the kidneys presented an unusual degree of spirochæte localization with definite lesions. In two cases of acquired syphilis--those of a young man with a roscolar eruption and a young woman with maculo-papular eruption, both dying from arsphenamine poisoning--a similar localization of spirochætes in the kidneys, with positive evidence of excretion through the renal epithelium into the tubules, was observed. There is a more or less generalized spirochætosis in the body, with spirochætæmia. In the kidney there occurs a massing of the spirochætes about the convoluted tubules, and a passage of the organisms from the vessels and interstitial tissues into the tubules, where they undergo disintegration for the greater part. This destruction of the organisms in the kidneys is more marked in the case of syphilis than in infectious jaundice. According to Warthin, the elimination of spirochætes through the kidneys, with the production of associated renal lesions, appears to constitute a family characteristic for the entire group of spirochætal infections, so far as the known types of the organisms have been studied carefully. *Spirochæta pallida*, as is *Sp. icterohæmorrhagica*, may be excreted in enormous numbers through the convoluted tubules. During such excretion through the kidneys, Warthin concludes, the spirochæte of syphilis suffers greater destruction than does the icterogenic parasite, so that fewer spirochætes may reach the urine in syphilis than in infectious jaundice. The demonstration of the occurrence of syphilitic spirochæturia, therefore, is not likely to possess such diagnostic value as that of icterogenic spirochæturia.

R. M. S.

[107] The staining of spirochætes in cover-glass smears by the silver-agar method.—A. S. WARTHIN and A. C. STARRY. *Jour. of Infect. Dis.*, 1922, xxx, 592.

THE authors state that the dark-field and Indian-ink methods for the demonstration of spirochætes are dangerous for the inexperienced laboratory worker, and believe that fine morphological differences are more easily recognizable in the stained smear; they regard the use of the latter as the safest procedure in the clinical recognition of syphilis. Their method of applying silver impregnation to the study of spirochætes in smears is as follows: (1) Prepare smears on No. 1 cover-glasses. (2) Dry thoroughly in the air. (3) Place in absolute alcohol three to five minutes. (4) Wash in two changes of distilled water. (5) Rinse cover-glass with smear in 2 per cent silver nitrate. Cover the smear side with another perfectly clean cover-glass also rinsed in the silver nitrate solution. Place the adherent pair of cover-glasses carefully, so as not to separate them, in a bottle of 2 per cent silver nitrate, and place in an incubator for one to two hours; then remove the cover-glasses and separate them. In heavy smears with much serum or cell material it is of great advantage to use hydrogen peroxide to clear up the background. Between steps 4 and 5 the cover-glass is placed in concentrated hydrogen peroxide for five to twenty minutes. It is then washed in two changes of distilled water before proceeding with step 5. (6) Place the cover-glass with the smeared side up in the following mixture: 2 per cent silver nitrate solution, 3 c.c.; warm

10 per cent aqueous gelatin solution, 5 c.c.; warm glycerol, 5 c.c.; warm 1.5 per cent agar suspension, 5 c.c.; 5 per cent aqueous hydroquinone solution, 2 c.c. In preparing the reducing mixture the agar suspension is added after mixing the silver nitrate, gelatin, and glycerol, and the hydroquinone stirred in just before using. (7) After the solution is reduced, and the smears have turned a light brown, remove and rinse in 5 per cent sodium thiosulphate solution. (8) Rinse in distilled water. (9) Absolute alcohol, xylol, balsam.

R. M. S.

VEGETATIVE NEUROLOGY AND ENDOCRINOLOGY.

- [108] **Scleroderma—a disease of the vegetative nervous system** (Die Sclerodermie—eine Erkrankung des vegetativen Nervensystems).—GOERING. *Deut. Zeits. f. Nervenh.*, 1922, lxxv, 53.

THIS is a short and interesting paper, accompanied by a good bibliography. The author brings together briefly the evidence in favour of the theory that scleroderma is of nervous origin, and that the particular part of the nervous system involved is the sympathetic. She says that the first suggestion that sclerodermal changes might be due to nervous disturbance arose from their limitation in occasional cases to the area supplied by a particular peripheral nerve, and she refers to thirty such cases. Many cases of the limitation of the changes to the distribution of a particular spinal root or segment, she states, are on record. Cases in which the distribution is symmetrical, and the rare cases in which the whole of one side of the body is affected, support the theory. Furthermore, scleroderma has sometimes been found in association with undoubted nervous diseases—e.g., herpes zoster, myelitis, syringomyelia—a rather slender argument in favour of its nervous origin.

From the facts that sensory changes are not present in scleroderma, and that section of a peripheral nerve does not cause scleroderma, the author argues that the changes must be produced as a result of irritation of nervous elements rather than of their destruction.

The arguments in favour of the sympathetic being the part of the nervous system involved are many and various: the absence of motor or sensory disturbances; the association, in reported cases, of abnormal pigmentation, of changes in the nails and bones, and of vasomotor and secretory disturbances, are mentioned; but most important is the consideration of the tissues involved in the changes, viz., skin, fat, interstitial tissue, bones, joints, over all of which, the author has reason to believe, the sympathetic exerts a trophic influence.

J. P. MARTIN.

SENSORIMOTOR NEUROLOGY.

- [109] **Epidemic encephalitis** (Ueber Encephalitis epidemica auf Grund der Erfahrungen der 1920'er Epidemie).—VON SARBO. *Deut. Zeits. f. Nervenh.*, 1922, lxxiv, 285.

AMONG 25 cases of encephalitis epidemica, Sarbo had 7 in which the onset was purely lethargic, 6 lethargic with psychic disturbances, and 4 lethargic

with psychic disturbances and chorea. Two cases died in the acute stage, 2 others died within three and a half months, while 6 were considered cured. Of the remaining 15, 10 subsequently presented the 'amyostatic symptom-complex'.

In a short general discussion, Sarbo divides the encephalitic symptoms into five groups: (1) lenticular, (2) myasthenic, (3) cerebellar, (4) trophic, (5) psychic. In the first group he places rigidity, fixed expression, slowness of movement, and pseudo-Parkinsonian tremor. In the second, weakness and tiredness, difficulty in swallowing and chewing; one of his cases had temporarily a myasthenic reaction in some muscles. In the cerebellar group he puts loss of balance in upright posture, retropulsion, and lurching gait; but in a footnote he states that he now believes part of the loss of balance to be due to 'dysfunction of the red-nuclear system'. His fourth group comprises greasiness of the face, changes in the skin generally, and salivation, besides the increase or decrease of fat which sometimes occurs. Of the psychic functions, after the lethargy has passed, the most striking is loss of initiative; perhaps the nocturnal insomnia also falls into this group.

He considers that in the chronic cases the process at work is probably twofold: (1) a sclerosis following the primary acute inflammation, and (2) a continuous chronic inflammation.

J. P. M.

- [110] Disturbances of sleep as sequelæ of encephalitis lethargica (I disturbi del sonno postumi di encefalite epidemica).—M. ZALLA. *Riv. di Patol. Nerv. e Ment.*, 1922, xxv, 375.

THE author describes eight cases, of ages ranging from 1 to 50 years, in which a condition was observed similar to that described by Hofstad as occurring in 20 children. In these the patients exhibited extreme restlessness directly they were settled down to sleep. In children this took the form of violent movement and grimacing, and even shouting and talking. At other times there was not the slightest sign of any psychic disturbance, and certainly none of mania. On the contrary, there was a certain degree of apathy. The two explanations put forward to account for this are a circulation of toxins and an alteration in a hypothetical sleep centre. Every conceivable remedy had been tried, without the least effect. While some of the cases seemed to show spontaneous cure, the prognosis was most uncertain.

R. G. GORDON.

- [111] Clinical observations of 39 cases of the Parkinsonian syndrome following encephalitis (Osservazioni cliniche su 39 casi di 'sindrome Parkinsoniana' postencefalitica).—M. ZALLA. *Riv. di Patol. Nerv. e Ment.*, 1922, xxvii, 3.

OF his 39 cases, the author found 27 in the male sex and 12 in the female: 31 occurred in subjects under forty. Although some cases showed a neuropathic history, this was negative in the majority. There did not seem to be any emotional factor constantly present to account for the onset of the Parkinsonian syndrome. A definite acute onset of the encephalitis was

absent in 8 cases, and the chronicity of the sequel had no relationship to the acuteness of the original disease. There was a definite continuity between the acute attack and the sequel in 28 cases. In one case there seemed to be an interval of a year, though it is not clear that there was ever complete restoration to health. Several associated symptoms not met with in true Parkinson's disease are described as occurring in the cases under observation.

The author is gloomy as to prognosis, though he thinks there is a tendency to spontaneous improvement and even cure. Most remedies have proved ineffective in his hands, but he thinks that small repeated doses of scopolamine relieve symptoms.

R. G. GORDON.

- [112] **The amyostatic symptom-complex** (Der amyostatische Symptomenkomplex und verwandte Zustände).—(1) POLLAK. *Deut. Zeits. f. Nervenhe.* 1922, lxxiv, 80. (2) JAKOB. *Ibid.*, 47.

THE term 'amyostatic symptom-complex' was used by Strümpell in a paper in 1915 as a comprehensive term to include the symptoms of Wilson's disease, of pseudo-sclerosis, and especially of the paralysis-agitans-like condition which occurs as a sequel of epidemic encephalitis—in fact all those symptoms which we attribute to lesions of the extrapyramidal motor system. The term was based on the conception that besides the nervous mechanism which produced (and co-ordinated) the movements of a group of muscles acting on a joint (myomotor), there was another mechanism which innervated and co-ordinated the muscles so as to keep them and the joint at rest (myostatic). It is evident that such a mechanism must be closely associated with the maintenance of normal muscle tone, and so if any part of it breaks down there will occur not only (1) involuntary movements, i.e., inability to maintain steadiness (amyostasis), but also (2) changes in muscle tone and its co-ordination. To all the group symptoms which may be held to arise from such disturbances Strümpell gave the name 'amyostatic symptom-complex', and he attributed it to lesions of the corpus striatum.

Pollak, in opening a discussion on the subject at the Gesellschaft Deutscher Nervenärzte, gave an account of the basal ganglia and their known connections. He treated the matter phylogenetically, ontogenetically, and histologically, collating the writing of original workers—Wilson, the Vogts, Spiegel, and others. From the phylogeny several facts can be deduced: (1) That the corpus striatum is probably not directly influenced by the cortex; (2) That its main connection is with the thalamus; (3) That its connection with the hypothalamus is earlier (more elementary) than its thalamic connection (Edinger); and (4) That the putamen and caudate nucleus are essentially one structure. From the embryology we learn that the basal ganglia develop from a point at the base of the lateral wall of the cerebral vesicle: developing from the surface of this vesicle they are related to the cerebral cortex. Coming to the histological structure, Pollak first mentions the different kinds of cells found in the ganglia, and then proceeds to investigate the tracts passing to and from them. The

chief strio-petal connection is with the thalamus—thalamus to putamen; from the putamen fibres course into the globus pallidus, and from there outwards to many parts of the brain—to the homolateral thalamus, hypothalamus, red nucleus, and substantia nigra, and to the contralateral hypothalamus (and hence to the contralateral corpus striatum). The principal secondary connections within the brain would appear to be with the cerebellum and with the nuclei of the pons. The question then arises. By what tract or tracts do impulses from the basal ganglia pass down into the cord? The obvious answer is. By the rubrospinal tract: but Pollak, chiefly on phylogenetic grounds, rejects this, and suggests several minor paths—relays of short fibres from the pontine nuclei, descending fibres from the smaller nuclei in the hypothalamic region, perhaps even the sympathetic tract.

One of the best parts of the paper is that in which the author considers the various influences which act on motor impulses—influences from the anterior and posterior central convolutions, from the frontal lobes, from the corpus striatum, and from the cerebellum—and the points at which these various influences come into association with each other. Here he attributes an important rôle to the red nucleus, and less important parts to the pontine ganglia and the olives.

The paper ends with a warning of the danger of lightly ascribing complex symptoms to lesions of single parts when the whole system is so involved.

The correlation of the amyostatic symptom-complex with pathological findings was dealt with at some length in Jakob's paper. He traced the development of the idea of an extrapyramidal motor system from the assertions of Bonhoeffer and Anton in 1897 that the source of the movements in chorea did not lie within the pyramidal system. In 1911 Mingazzini emphasized the motor function of the lenticular nucleus, and in 1912 Wilson ascribed to it control over muscle tone as well as over involuntary movements. Recently C. and O. Vogt have regarded the 'striatum' and 'pallidum' as the centre for primary automatic movements, the 'pallidum' bringing about the elemental movements of earliest infancy, and later coming under the controlling influence of the 'striatum'. More recently still, however (1921), Stertz has attributed to the lenticular nucleus merely a controlling influence over automatic movements, and supposes the origin of the movements to be in the motor nuclei of the cerebellum.

The first really pathological part of the paper deals with senile chorea, of which the author has examined 6 cases; 5 of them showed pronounced atrophy of the basal ganglia generally, but especially of the caudate nucleus, the small cells of the ganglia being much more affected than the large; the sixth case, which had complications, showed extensive fatty changes in the corpus striatum, including the globus pallidus.

* Paralysis agitans presents pathologically a sharp contrast to chorea, because in it the large cells are most affected and 'striatum' and 'pallidum' are about equally involved. Jakob emphasizes the constancy of this finding, and discusses the views of various workers on this subject: he does not attempt to decide whether the degeneration in the 'striatum' or

that in the globus pallidus is the more significant: but he regards part of the changes in the globus pallidus as secondary to those in the putamen.

Wilson's disease and pseudosclerosis are next discussed, and reference is made to Fuchs' experiments with guanidin and with Eck's listulae, intestinal intoxication being regarded as an etiological factor in lenticular degeneration.

Coming to the consideration of athetoid movements, Jakob says "athetosis evidently demands a 'striatum' at least partly capable of function, while progressive degeneration of the 'striatum' and the consequent release of the globus pallidus put a stop to positive motor symptoms by general rigidity".

As regards encephalitis lethargica and its sequelae, correlation of symptoms and pathological findings is most difficult, owing to the extensive distribution of the lesions, and little attempt to draw conclusions is made. Mention is made of Economo's finding of quite recent patches of inflammation in a chronic case, showing that the active process may continue for years.

Jakob gives particulars of several peculiar cases, and arrives at two conclusions: (1) That if a lesion or degenerative process is limited to the 'striatum', choreic movements develop as a rule, but that under certain conditions, not yet fully understood, athetoid movements may be produced; (2) Very extensive damage to both globi pallidi causes a general rigidity.

Both these papers show the extraordinary difficulties with which the elucidation of the functions of the basal ganglia is surrounded, and neither asserts that the 'amyostatic symptom-complex' has as an entity an anatomical basis.

J. P. MARTIN.

- [113] **Studies of extrapyramidal syndromes: progressive infantile torsion spasm (syndrome of the corpus striatum)** (Études sur les syndromes extra-pyramidaux: spasme de torsion progressif infantile [syndrome du corps strié]).—A. WINNER. *Revue neurol.*, 1921, xxxvii, 952.

This is a detailed case report with post-mortem findings, to which is appended a comment upon the group of disorders to which it belongs. A girl of 12 suffering from the disease in question came under the author's observation in July, 1920. The history was that two years previously the parents noticed that her movements were assuming an automatic character. The condition progressed gradually, and there supervened involuntary movements of the extremities which were said to be more violent during sleep. Latterly there had been disturbance of speech and difficulty in deglutition. When she was admitted to hospital in April, 1920, a note was made of general rigidity and choreiform movements. When she was first seen by the author, the striking features of the case were (1) bizarre and grotesque contortions of the trunk and limbs, and (2) great motor agitation.

During the whole of her stay in hospital the patient never for a moment assumed a natural attitude, even in sleep. The abnormal postures varied

somewhat from time to time, and did not lend themselves readily to description. They are illustrated in the text by photographs. It was always possible to manipulate the contorted limbs into other positions, and the author considers that hypotonus rather than hypertonus was a feature of the case. He makes an exception, however, in the case of the arms, which became rigid towards the end.

The involuntary movements approximated more nearly to those seen in chorea than any other recognized type. They were most evident in the limbs, but involved the respiratory muscles, and also the face, in which grimacing and smacking movements of the lips were observed. At first the patient was able to protrude her tongue normally, but later this became impossible. There was considerable dysarthria. Deglutition was normal while she was under observation. Voluntary power was good. There were no defects of sensibility, sphincter control was perfect, and the reflexes were normal. The mental condition was very slightly impaired until the last stages of the illness. Annular pigmentation of the cornea was not present. The liver dullness was notably diminished. The urine reduced Fehling's solution. The blood-sugar was normal. The patient died of pneumonia in August, 1920.

Clinically the case was certainly not one of double athetosis, and in many points it differed from Wilson's disease. It appeared to the author to fit best with the descriptions given by Ziehen, Oppenheim, and Flatau and Sterling of their cases of so-called torsion spasm, a case of which was also described by Thomalla in 1918, with an autopsy recording total bilateral necrosis of the putamen and cirrhosis of the liver.

At the post-mortem in the author's case the most notable findings were multilobular cirrhosis of the liver and an enlarged spleen. The lenticular nuclei appeared greyish-yellow; otherwise the nervous tissues seemed normal to the naked eye.

Histological examination of the brain showed widespread changes, the degree of which varied in different situations, while the general character of the lesions was constant. There were extensive degeneration and destruction of the nerve-cells and of the neurofibrils; but the most striking feature was the increase of glia-cells, which showed every stage of transition between the normal and the so-called Alzheimer cells. The picture corresponded with that described by Alzheimer in pseudo-sclerosis. These changes were most intense in the corpus striatum, especially the head of the caudate nucleus and the putamen, but were also found unmistakably in the thalamus and hypothalamus, in the mid-line of the pons, in the dentate nuclei of the cerebellum, and in the cerebral cortex. There were nowhere any gross foci of necrosis or cysts.

The author draws particular attention to the diffuse character of the lesions in his case. He asks whether it is the lesions of the corpus striatum which are responsible for the principal symptoms. He mentions other cases of Wilson's disease complicated by a lesion of the dentate nucleus, and emphasizes the necessity for thorough examination of all areas of the brain in such cases, lest we be led through faults of omission to attribute to the corpus striatum alone functions which really belong to a system of

neurones in which it plays a part. He considers it probable that Wilson's disease, pseudo-sclerosis, and torsion spasm are all different manifestations of the same disease, various clinical syndromes which depend upon one pathology. In relation to the particular clinical features of torsion spasm, he suggests that this may be correlated with the fact that this syndrome always makes its appearance in childhood. Possibly the nature of the motor symptoms may depend upon the age of the brain. As an instance in point he mentions the well-known fact that post-hemiplegic athetosis is rarely seen to develop unless the hemiplegia dates from infancy.

The paper is clearly written, and the bibliography is up to date. The microphotographs of the brain are inadequate, but this defect is made good by the lucidity of the text.

C. P. S.

- [114] **An essay on the shaking palsy**, by James Parkinson, M.D., Member of the Royal College of Surgeons; with a bibliographic note thereon.—A. J. OSTHEIMER. *Arch. of Neurol. and Psychiat.*, 1922, vii, 681.

A REPRINT of Parkinson's historic classic, of which only five copies are known to exist.

R. M. S.

- [115] **Heredity in epilepsy**.—CHARLES W. BURR. *Arch. of Neurol. and Psychiat.*, 1922, vii, 721.

BURR's investigations were concerned solely with cases of so-called idiopathic epilepsy: those in which there was evidence of gross cerebral disease were excluded. It was found that only 34 parents were known to be affected, and hence direct inheritance did not appear important. On the other hand, the frequency of insanity, crime, chorea, alcoholism, and epilepsy in relatives pointed towards congenital instability resulting from abnormality in the germ-cell or sperm-cell. From a consideration of all the data, Burr concludes that it is safe to assume that the effect of heredity is rarely direct: that usually it is indirect and general, not specific. In other words, a predisposition to nervous or mental disease is inherited; the resulting specific disease depends on external causes—it is environmental in the broadest meaning of the word.

R. M. S.

- [116] **Research on the value of the 'Marie-Béhague' test for the investigation of disturbances of delicacy of orientation** (Ricerche sul valore della prova 'P. Marie-Béhague' diretta a svelare i disturbi dell'orientamento fine).—A. FERRARO. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 74.

MARIE and Béhague described a syndrome of disorientation in space met with in cases of deep lesions of the frontal lobe. This occurred without other signs of disturbance of nervous or vestibular functions. Some patients were quite unable to direct any movements, others only failed in the dark, and others found difficulty only when executing special movements. To test slight degrees of disorientation these authors devised the

following method. The patient was taught to distinguish the four sides of a room by some simple means such as the side of the table, the side of the door, of the bed, of the window; his eyes were then bandaged, and he was turned first in one direction, then in the other, made to walk round in a circle several times, then stopped and asked to name which of the walls he was facing. In healthy subjects a mistake was never made, but in cases suffering from deep lesions of the frontal lobes hesitation and error were noted. This experiment was repeated by the author in a case of a lesion of one frontal lobe, apparently cured, and disorientation as described above was discovered. The author next tried the test on a large variety of healthy subjects, taking particular care to avoid possible additional indications of light, heat, and noise, and he found a high percentage of errors, which in his opinion makes the test valueless as a pathological symptom of any sort, and still more so as a pathognomonic sign of lesions of the frontal lobe.

R. G. GORDON.

[117] **Mutism in infantile nervous and mental disease** (I mutismi in neuropsichiatria infantile).—S. DI SANCTIS. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 189.

THE study of mutism in infants is very difficult, because the neurological examination of an infant needs limitless patience, because it is difficult to test the hearing in infancy, and because the infant cannot read or write. The symptoms generally show much more variation than in adult life. The causes are simple. Cerebral paralysis or Little's disease of all varieties, biopathic failure of development, and encephalitis from various causes, of which hereditary syphilis is far the commonest, are the chief. The author divides mutisms of infancy thus:—

Mutism without intellectual deficiency	{	Delayed development.
		Deaf-mutism.
		Mutism due to auditory defects.
		Mutism where hearing is perfect.
		Mutism due to aphasia.
		.. .. anarthria.
Mutism with intellectual deficiency	{	Mutism due to idiocy.
		.. .. prenatal failure of develop- ment (microcephaly).
		.. .. prenatal paralysis.
		.. .. postnatal early paralysis, or aphasia without paralysis.
		.. .. delayed postnatal aphasia without paralysis.

The first group can be diagnosed where there is obvious cause for delayed development or a family history of late talking, and where there is no auditory defect; but the delay should not be present after the age of $2\frac{1}{2}$, or at most 3. The author does not consider adenoids of much importance in this connection, though any interference with hearing certainly is, as

described below. Deaf-mutism is often confused with idiocy. If a galvanic current is passed through the two mastoids the absence of vertigo points to deaf-mutism. The presence of vertigo with a weak current (1 to 2 ma.) in a child who shows no signs of hearing noises points to idiocy. The true deaf-mute shows no signs of paralysis, and can express himself intelligently by gestures. The noise he does make in attempting to speak is without intonation. The prognosis of true deaf-mutism is hopeless; but the author describes a third group in which mutism persists only until the error in the auditory apparatus can be corrected. Such children suffering from middle-ear disease, etc., are often mistaken for idiots, but a careful examination will demonstrate their intelligence and their deafness. The reflex of the external auditory meatus (ticklishness) may be useful in this connection, as it is absent or reduced in deaf children. The mutism of cretins is said to be due to the myxœdematous changes in the middle-ear tissues.

In the fourth group, in which there is no defect of hearing, German authors have thought that this is a form of mild imbecility, while others have supposed it to be a form of sensory or motor aphasia in all cases. Others admit an idiopathic alalia, but regard it as a want of development, due to prenatal causes, of 'an intellectual and affective disposition to talk'. The author thinks that this idiopathic alalia is due to an arrest of development, not of the cortical centres, but of the afferent or peripheral nervous apparatus, so that owing to tone deafness the auditory word centres do not get sufficient stimulation and are delayed in their development. He distinguishes this type of mutism by the following features: (1) Congenital, thereby differing from aphasic mutism; (2) The hearing being apparently normal, but actually often showing bilateral defects of tone perception; (3) Mutism present, but capability of repeating short words at command; mimicry and 'internal language' unaffected; (4) No dysarthria; (5) Sufficient intelligence, though peculiarities may be found; (6) High-grade capacity for education, so that this type is not met with in adult life, but in cured cases it is found that though the intonation of speech is efficient these individuals are taciturn, and sometimes are ungrammatical.

The fifth group, mutism due to aphasia, should be confined to those who have lost the power of employing verbal symbols in thought. Hence all cases in this group are acquired, and due to lesions occurring after the commencement of language development. Several cases of congenital aphasia have been described, but the author thinks that they require reconsideration. Cases of mutism due to aphasia generally show some paralytic symptoms or epilepsy as well, and though there is usually no psychic defect the child is 'unstable'. Transitory aphasias occur after epileptic fits or febrile diseases, but permanent aphasia may occur after trauma or after intracranial disease, and in the latter case may be the only persistent sequel. If the lesion is unilateral such aphasias are capable of re-education, but not if it is bilateral. The sixth group includes those who are mute because of anarthria or dysarthria. Such cases occur in infantile cerebral paralysis and in infantile bulbar paralysis and pseudo-bulbar paralysis. Usually the infantile cerebral paralysis is accompanied by epilepsy and idiocy, but in rare cases this is not so.

The second division, of mutes with defective intelligence, includes the idiots, who show all varieties of mutisms. In congenital idiots there is often a certain capacity for improvement, especially if other complicating conditions can be removed. A more serious condition is that accompanying early prenatal or postnatal cerebral paralysis. Much obscurity surrounds the question of the mutism of idiots, and some authors hold that an idiot cannot talk because he lacks the capacity to form internal speech, others because he lacks the capacity to articulate words. As a matter of fact, although an idiot does not understand much more than he can express, the aphasic idiot seems less intelligent than he really is, and often in the course of development comes to be able to do more than might be expected. The author also describes a delayed aphasia and intellectual inferiority without paralysis. In these cases the progress is gradual and the patient may be left with a few short words. The lesions are bilateral, cortical, and usually syphilitic. It is progressive, but not fatal. The aphasia and the dementia progress together, and one does not depend on the other.

As to treatment of mutism, the author thinks that education is of great value if begun early, and that unilateral lesions are of no great importance in infancy. Antispecific treatment does very little good.

R. G. GORDON.

[118] **Heteræsthesia in direct concussion of the spinal cord** (L'hétéresthésie dans la commotion directe de la moelle épinière).—
J. LHERMITTE and L. CORNIL. *L'Encéphale*, 1922, xvii, 201.

ACCORDING to Lhermitte and Cornil, heteræsthesia is exceptionally rare, for they have only seen one example of this interesting phenomenon since it was described by Graham Brown in 1920. (See *BRIT. JOUR. NEUROL. AND PSYCHOPATHOL.*, 1920, i, 51.) Their patient, a sergeant, age 25, was wounded on Sept. 2, 1918, during an attack. The bullet entered the left supraspinous fossa 4 cm. from the 2nd dorsal vertebra, and made its exit in the right infraspinal fossa 4 cm. from the internal border of the scapula. The soldier was lying on his face when hit, and at once became paralysed in both lower limbs. Four days later he experienced burning pains in the lower extremities, which occurred from very slight contact, such as pressure of the bedclothes. Eventually they disappeared, to be replaced six weeks later by a new type of sensory disorder, described as lightning pains resembling electric shocks, and excited solely by flexion of the head. After the lapse of six months they too disappeared. Paraplegia was at first complete, but rapidly diminished, and by Jan. 20, 1919, the patient could walk almost without assistance.

When examined on Feb. 26, 1919, there was no inco-ordination, ataxia, or dysmetria; muscle tonus and electrical reactions were normal. A very slight degree of motor weakness in the lower limbs was still present. The application of a soft object to the legs gave rise to a sensation of heat; otherwise sensory functions were normal.

A second examination on Oct. 15, 1920—that is, more than two years after the date of injury—showed an almost complete disappearance of the motor disability; but there were now present new and distinctive sensory

changes. Of his own accord the patient drew attention to certain areas on the right thigh where painful sensations were evoked by contact with some object, or even part of the clothing. A cold stimulus also evoked pain, but of a less intense character. These abnormal sensations never occurred spontaneously, and the boundaries of the areas on which they were experienced could be readily and precisely mapped out by drawing the point of a pencil over the skin, while the patient at the same time indicated with one finger the site of the disagreeable sensation. These zones of heteræsthesia corresponded exactly to the distribution of the 1st, 2nd, and 3rd lumbar, and part of the 2nd sacral sensory nerve roots. In spite of the existence of heteræsthesia, the sensations conditioned by pin-prick, pressure, and temperature remained normal on the affected area; there was, however, a slightly raised threshold for the appreciation of two points of a compass. Localization and deep sensibility were not affected. Contrary to the experience of Graham Brown, the areas of heteræsthesia were very persistent, and were still present when the patient passed out of observation.

In their discussion of this phenomenon the authors state that they consider it certain that heteræsthesia cannot be caused by a lesion of the posterior nerve roots, nor are they able to accept Graham Brown's theory of an alteration of a central mechanism co-ordinating the different spinal segments. They suggest as an alternative hypothesis that the phenomenon is related to an unequal implication of the intraspinal sensory fibres, which are known to retain their radicular grouping in their passage through the spinal cord. Such an explanation seems to square best with the known anatomical facts.

R. M. S.

- [119] **The nervous symptoms associated with local malformations of the spinal column, especially those of the last lumbar vertebra** (Les syndromes nerveux liés aux hétéromorphismes régionaux du rachis, en particulier à ceux de la vertèbre présacrée).—ANDRÉ ROCCAVILLA. *Revue neurol.*, 1921. xxxvii. 39.

MALFORMATIONS of the vertebræ are often found at those levels of the spinal column at which its architecture changes from one form to another, i.e., at the junction of occiput and atlas and at the cervico-thoracic, thoracolumbar, lumbo-sacral, and sacro-coccygeal junctions. Any of these may give rise to symptoms. The commonest malformations are those in which either the vertebra above the point of junction possesses characteristics of that below it, or vice versa. The best known of these is that in which the 7th cervical vertebra possesses thoracic characteristics—the so-called cervical rib.

The writer here concerns himself chiefly with the symptoms due to sacralization of the last lumbar vertebra. Anatomically the degree of sacralization varies from that in which the transverse processes of the vertebra are but slightly enlarged, to the extreme in which they extend as far as, and articulate with, the ilia. Supervening inflammatory changes may result in bony union, the sacrum then appearing to be made up of six segments with five pairs of neural foramina. The bony canal for the 5th

lumbar root on either side may be so narrow as to result in compression of its fibres. In addition, secondary changes, mechanical and inflammatory, may cause symptoms referable to the 4th lumbar and 1st sacral roots.

The symptoms may be divided into three groups: (1) Lumbar or lumbosacral pain with stiffness of the back. The pain sometimes radiates into the groins and lower abdomen. The objective signs are few—*points de Valleix*, flattening of the lumbar curve, and, if the malformation is unilateral, a little scoliosis. (2) Diffuse pains over the sacrum and in the buttocks, sometimes accompanied by stiffness, sometimes by weakness in the muscles of these parts. In addition, there may be paroxysms of pain radiating down the thighs and legs as far as the toes. Lasègue's sign is often positive, especially after a paroxysm. (3) Pain of sciatic distribution which corresponds to that described by Dejerine under the name of radicular sciatica. With this are found minor defects of motor and sensory function which follow root distribution, together with a diminution of the tendon-jerks. Tenderness of the nerve-trunks to pressure may be present. The symptoms may be on one or both sides.

Symptoms are not commonly caused by the simple presence of the malformation. As a rule determining factors are present, of which the commonest are the after-effects of trauma. Other causes may be tubercle, syphilis, or non-specific inflammatory processes. The author points out that the malformation may exist without giving rise to any symptoms at all, and issues a warning against the danger of ascribing to this condition, when discovered by the *x* ray, all pains which may occur in the neighbourhood. The diagnosis is each case must be considered on its clinical merits.

For most cases the best treatment is manipulation by means of passive and active exercises, together with heat in various forms, and electro- and radio-therapy. In some cases of trauma, and in the presence of active inflammatory changes, tuberculous or otherwise, fixation by splints may be required. Finally, in selected instances the surgeon may be asked to clear a new pathway for the compressed nerve roots.

The paper is well illustrated with radiograms and sensory charts, and a number of references to the literature are given.

C. P. S.

[120] **Lumbo-ischial pains of vertebral origin: their morphological, radiographic, and clinical entity** (Les syndromes lombo-ischialgiques d'origine vertébrale: leur entité morphologique, radiographique, et clinique).—W. BERTOLOTI. *Revue neurol.*, 1922, xxxviii, 1112.

THE author quotes a phrase of Raymond's to the effect that the causes of so-called idiopathic sciatica remain to be discovered. He believes that in at least 80 per cent of the cases the trouble is due to vertebral disease which may be detected by the *x* rays. The 5th lumbar vertebra is most often the seat of the trouble. Leaving on one side traumatic lesions and tuberculous caries, he proceeds to discuss:—

1. Ossification of the ligaments, or pseudo-sacralization. This has nothing to do with true sacralization, which is a congenital anomaly

and non-progressive. Pseudo-sacralization results from calcification of the iliolumbar and sacro-iliac ligaments secondary to chronic inflammatory changes of rheumatic nature.

2. Chronic lumbar arthritis. In these cases the inflammatory changes are not confined to the ligaments, but affect the vertebrae themselves. From this may result a sliding forward of the 5th lumbar upon the 1st sacral, or a condition in which the 5th lumbar is forced downwards so that in the *x* ray its transverse processes appear superimposed upon the posterior aspect of the ilium. The author believes that this condition has often been mistaken for sacralization. Although arthritic changes may supervene upon true sacralization, the two conditions are primarily distinct.

3. True sacralization. The aspects of this condition have not yet been sufficiently established upon an anatomical basis by post-mortem dissection. Mere enlargement of the transverse processes of the 5th lumbar is of no account. True sacralization, in the author's opinion, exists only when there is fusion of the lateral elements of the 5th lumbar with the auricular surfaces of the sacrum and ilium. This is usually accompanied by malformations of the sacrum itself, and these congenital anomalies may lead to other static changes affecting the poise of the whole vertebral column.

The title of this paper is misleading in so far as the clinical aspects of the various conditions mentioned are not described in detail.

C. P. S.

[121] **The post-neuritic muscular hypertrophies.** (*Les hypertrophies musculaires postnévritiques*).—KNUD H. KRABBE. *Revue neurol.*, 1921, xxxvii, 802.

THE case is reported of a young fisherman who came under observation during military service on account of pains and weakness in the legs experienced on the march or in the gymnasium. Eight years previously he had had an attack of paraplegia, which came on suddenly with pains in the affected limbs. From this he recovered gradually, but during convalescence he noticed an increasing hypertrophy of the muscles of his legs, which after a short time reached the size observed by the author. He had been able to carry on his work as a fisherman, but his lower limbs fatigued rapidly, and he experienced pains in the calves on prolonged exertion. The calf muscles were much hypertrophied, their power being rather less than normal. On palpation they appeared to be of a natural consistency. The electric reactions were quantitatively diminished. No other physical abnormalities were discovered. A piece of muscle was excised during life and examined microscopically. The muscle fibres showed abnormal variation in size, some being considerably hypertrophied. There was no increase in connective tissue, and no fatty degeneration.

The author reviews briefly the stories of 20 cases of true (pathological) muscular hypertrophy which he has collected from the literature. It is remarkable that in no less than 5 of these the condition appeared after an attack of typhoid fever. In some of the others there was a history of general infection or local injury, in some no apparent cause. In several

instances there is mention of pain, and in some there was definite cutaneous anæsthesia.

The best account of this interesting condition previously given is by Léri, who divides the cases into those in which the hypertrophy depends upon vascular disturbances, and those in which it appears to have an independent origin. For the latter, he accepts Tanna's definition of hyperplastic muscular dystrophy.

Krabbe believes that in the majority of cases the primary cause is a neuritis with subsequent exaggeration of the normal process of repair. He compares as similar instances cheloids, amputation neuromata, and hypertrophic osteitis.

C. P. S

Psychopathology.

PSYCHONEUROSES AND PSYCHOSES.

- [122] **Two cases of war neuroses.**—JAMES YOUNG. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii, 230.

THIS paper gives the Jungian interpretation of some of the phenomena of the war neuroses in answer to Dr. G. H. Fitzgerald's exposition from the Freudian standpoint. Young cites two cases of morbid anxiety arising in men who had done prolonged service without receiving any definite trauma, and shows how the patients were reacting against a narrow and one-sided development of their personality. The conflict has to do with the acceptance of and adjustment to the compensating function. The 'persona' is essentially narcissistic and maintains a struggle with the unconscious, so that there is little libido available for external relationships; yet the menace from the unconscious has its counterpart in the affairs of everyday life. As the patient cannot find a point of application for his effort against the intangible enemy, his effort only serves to drain him of energy; the effect of which is expressed in his various symptoms. The inimical forces must be brought into and accepted in consciousness, for only after the acceptance of them and the abandoning of the old one-sided ideal can a new, more satisfactory orientation be reached.

Young concludes by saying that, in his opinion, the stress and strain of war simply serve to unmask a tendency to neurosis, and that the so-called traumatic moments are either artefacts or unessential secondary occurrences.

ALFRED CARVER.

- [123] **A man's unconscious phantasy of pregnancy in the guise of traumatic hysteria.**—MICHAEL J. EISLER. *Internat. Jour. of Psycho-analysis*, 1921, 3/4, 255.

THE case reported appeared at first to be one of hysteria due to shock. On analysis it became evident that an x-ray investigation in hospital, the significance of which had been reinforced by important experiences in

childhood and puberty, and not the actual accident, was the immediate determining motive of the illness. The symptom arising indulged a passive homosexual wish-phantasy, and at the same time the neurosis mobilized a multitude of anal-erotic memory-traces which took the lead in giving shape to the symptom. The gradual dissolution of the pathogenic repressions was achieved by obtaining access to the sources from which the neurosis derived its energy.

The case demonstrated the significance of anal-erotic fixation in the development of certain character traits, the knowledge of which aided in the clearer understanding of the inner motives at work in the causation of the neurosis. It would appear that anal-erotism could draw to some extent on the co-operation of the other component instincts—oral, olfactory, urethral—and direct the libidinous complement which they could contribute.

Amongst others the following points are discussed: the infantile phantasy of identity of the child with faeces; the fear of being poisoned as a dream-symbol of pregnancy; the fact that most faecal-symbols—hair, nails, teeth, etc.—are also castration-symbols; the relation between sadism and anal-erotism, and the influence (in the above case) of the co-existing flatus-complex.

C. W. FORSYTH.

[124] Depressions, their nature and treatment.—WM. STEKEL. *Psyche and Eros*, 1921, ii, 333.

A MOTIVATED grief is not depression in the neurotic sense, for the patient does not know why he is sad. But this ignorance is the result of repression. The patient refuses to acknowledge the cause of his grief, or rationalizes around it. Thus the neurotic has a secret calendar in which he records unconsciously (or more properly foreconsciously) events which have caused him secret joy. The depressions which sometimes occur on regular anniversaries—the death of a parent or near relation—are the conscious counterpart of, and self-punishment for, death wishes whose acknowledgement would result in unbearable conflict.

Misic, a fruitful cause of depression, arouses in us the memory of erotic longings of a forbidden kind which is dealt with by the formation of depression. So, too, the familiar morning depression is the guilty aftermath of the world of phantasy in which the sleeper had been living, till his awakening had brought him once more into contact with reality.

"All depression is a moral reaction to immoral desires, and witnesses the hopelessness of the secret sexual strivings." Onanism is not, as is generally represented, followed by a depression, but this is caused by a cessation of the practice. The sexual longings, deprived of any outlet, turn back upon the ego and heap upon it the reproaches which are in reality directed against the environment. The familiar depressions, the "week-end neurosis", the hypochondria which so often sets in when a busy man retires from affairs, are motivated by the removal of the defence barrier of 'busy-ness' which protects the neurotic from his sexuality.

Stekel justly insists that no depression is groundless, though one would be inclined to doubt whether the many examples he gives furnish a fair

idea of the actual etiology. Psycho-analytic research has taught us to look beyond the manifest and recent causes (which are as a rule eagerly acknowledged by the patient) to the infantile sex life. Psychic traumata of a recent kind act only by linking up with this infantile material, and in virtue of their correspondence with unconscious phantasy.

G. H. F. G.

[125] **Change of phase in the psychoses.**—THOMAS BEATON. *Jour. of Ment. Sci.*, 1922, lxxiii, 48.

IN this paper the author discusses the matter of the change of phase observed commonly in the early stages of psychotic development, with special reference to the significance and importance of the occurrence of confusion. He considers that the morbid symptoms of the early psychotic are novel, exciting, and most interesting facts of experience to the patient concerned, upon which he is bound to rationalize and to which he must attend. In the absence, therefore, of any degree of confusion, the patient is bound to review all his past life in the light of the new experience, and to systematize his relationship to his environment in order to suit the new facts. With the development of a phase of confusion, however, systematization ceases, because the powers of intelligent association are no longer operative; the organization of the new experience is weakened in proportion to that laid down prior to the development of the psychosis, according to the rule that the latest acquirement is the first to be lost; and influence can be brought to bear on the patient, who, owing to his difficulty of intelligent thought, cannot meet argument with argument and is therefore more likely to take a suggestion.

Cases are cited illustrating the change of attitude observed in patients following a confusional phase, and the author concludes with the suggestion that it might be advisable to induce a temporary confusion in early cases so that advantage might be taken of the interruption of the processes of intelligent association and systematization.

T. B.

PSYCHOLOGY.

[126] **The aims of ethnology.**—The late W. H. R. RIVERS, F.R.S. *Psyche*, 1922, iii, 118.

FORTY years ago it was believed that mankind developed its cultures independently, and Bastian's theory that similarities in beliefs and customs of different people were due to some innate quality of the mind was generally accepted. In defending the opposite view, that a succession of cultures spread over the world and were widely distributed, Rivers quotes Elliot Smith's anatomical researches on Egyptian mummies. In the third millennium B.C. there had been an invasion from the north of people with rounder heads of the Armenoid type, skulls of this type being found as far south as the Chatham Islands. From this, Elliot Smith concluded that early man moved extensively about the earth. From his studies in Melanesia, Rivers was led to believe that the introduction of external culture among an indigenous people is greatly modified along the lines

of either development or degeneration; this caused him to discard the concept of independent evolution. The introduction of new ideas among an isolated people leads to a definite process of evolution. In Melanesia, when this newly-set-up evolutionary process reaches a certain pitch, it comes to an end and is followed by a period of stagnation until some fresh external influence starts a new period of progress.

W. J. Perry discovered that the motive for man's early wandering was the search for objects required to satisfy human needs—material, aesthetic, and religious. This wandering was found to be in relation to the distribution of megalithic monuments, and Perry found evidence of these monuments in the form of dolmens in the East Indian Archipelago islands, resembling those in other parts of the world.

Elliot Smith believes that the original home of this culture was Egypt, and, from his anatomical researches on a mummy taken from the islands of Torres Straits, concluded that the method of mummification found in this case spread originally from Egypt. Rivers proceeds to support this view with other interesting details, and concludes by considering the aims of ethnology. These are the formation of laws governing the activities and fates of tribes and empires, as well as supplying records of our own past on the psychological side. He states that the study of primitive man of to-day may help us to understand the ancient cultures which have effected our religious, ethical, and social conditions. Rivers urges the needs of ethnology, and points out that much valuable material is being lost by the rapid extinction of certain tribes. He advocates the need for research before it becomes too late.

ROBERT M. RIGGALL.

[127] The biological and social significance of the expression of the emotions. — CAMILLE NONY. *Brit. Jour. Psychol. (Gen. Sect.)*, 1922, xiii, 76.

NONY considers the evolution of the expression of the emotions from the biological to the social. The term 'expression of emotions' is used in a general sense as being the sum of the various bodily reactions that accompany the psychic state. The total emotional reaction is found to be partly specific to the emotion, partly specific to the individual. Discussing the views of Darwin, Bechterew, and Dumas, the author concludes that emotional reactions are the mechanical result of nervous excitation, and have nothing in them which warrants us in assuming that they indicate a predeterminate purpose. In a reaction strictly adequate to the stimulus there is no room for emotion, which latter only develops when there is a diffusion of excitement. Turning to the social significance of the expression of emotions, Nony distinguishes three phases of development. First, there is the involuntary biological mechanism previously discussed. Secondly, in a community the members, by observing emotional expression in their fellows, are able to interpret the correlative psychic state. Thirdly, there is the effect produced upon others when they are confronted by an emotional reaction. As the reaction can to a certain extent be imitated voluntarily, it comes to be used when an individual wishes to produce in

his fellows that effect which the spontaneous expression would induce, e.g., fear or pity. Emotional mimicry in this way gradually empties itself of its affective content and becomes symbolie. The expression of emotion thus evolves from a biological mechanism into a language.

ALFRED CARVER.

- [128] **The constituents of the unconscious.**—LEONARD WILLIAMS. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii, 259.

LEONARD WILLIAMS considers that there is or has been a tendency among those engaged in psychology to regard the operations of the mind as independent of physical phenomena. This he sets himself vigorously to combat, claiming that the mind itself is primarily physical and must have existed in the scale of evolution even before the vertebrata emerged. The brain and higher centres are viewed as mere mushroom growths compared with our visceral ganglia and endocrine system, which dominate the whole of the reaction system. This is reminiscent of Kempf's thesis that the autonomic segments are practically complete masters of the central nervous system, which he terms the projicient apparatus. Williams considers the vegetative system as the seat of the unconscious mind, rather after the manner in which Descartes described the pineal gland as the seat of the soul. He then briefly reviews some of the evidence indicating the enormous influence which the endocrine glands and vegetative nervous system exercise upon the development and continued activity of body and mind, instancing particularly the intimate association between suprarenals and the brain itself. He concludes with the following words: "You will arrive at much better results and more helpful if you will turn from the rather fanciful analysis of unsubstantial dreams in order seriously to study the evidences of the endocrine pattern. They, and they alone, can read you riddles and show you miracles". How this would help in the treatment of a case of conversion hysteria—say a monoplegia—is, however, not explained.

ALFRED CARVER.

- [129] **Some problems of adolescence.**—ERNEST JONES. *Brit. Jour. Psychol. (Gen. Sect.)*, 1922, xiii, 31.

DR. ERNEST JONES asks, "In what precisely does growing up consist?" He shows that the pre-puberty period should be divided into infancy (birth to about age 5) and childhood (roughly age 5 to 12), the post-puberty period into adolescence (age 12 to 18), and adult life. Infancy and adolescence have many features in common, and they contrast with the phases childhood and adult life. Dr. Jones then discusses five features of difference—intellectual development, integration, emotion and imagination, dependence—between the child and the adult. The most noteworthy characteristics of the child are (1) its inability to tolerate excitation without immediate response, (2) its egocentricity and desire to be loved rather than to love, (3) its dependence, which is closely related to the question of attachment to the parents and has a psychosexual basis. Incidentally it is this inhibited libido which is made use of in education.

During the infancy period the sexual life, both physical and mental,

is an exceedingly rich one, and passes through an important series of characteristic stages. Then follows the latency period (childhood), when some of the constituents of infantile sexuality are repressed, others sublimated. At puberty a regression takes place, and the individual proceeds to recapitulate and expand in adolescence the development through which he passed in infancy. When the process is completed, three things are found to have taken place: the impulse is no longer inhibited in regard to its sexual goal, it is directed towards strangers, and has become more altruistic, i.e., the capacity to love has grown at the expense of the desire to be loved. Thus in man (in contradistinction to other animals), sexual development, instead of proceeding smoothly to maturity has to be gone through twice, and a further difficulty is introduced by the attempts of society to prolong the pre-puberty period over the most active years of sexual life.

ALFRED CARVER.

[130] **Dreams, superstition, and neuroses.**—I. MARCINOWSKI. *Psyche and Eros*, 1921, ii. 193.

THE author advances the view that the belief in ghosts proceeds from the tendency among primitive peoples to regard their dream life as objective reality. The huntsman asleep by the camp fire dreams of mighty exploits in the chase; but, on awaking, his brother assures him that all the time he has been sleeping quietly. Thence he assumes that there is something within him which is capable of leaving his body when asleep—the dream soul—and thus arises the superstition that it is dangerous to awake a person suddenly from his sleep.

The reappearance of dead persons in dreams thus takes on a quality of reality, and just as the dreamer is more powerful than in reality, so the spirits of the dead are to be feared, for they have cast aside the bonds of the flesh. Earthly weapons being then useless, of necessity one must invoke powers of a supernatural kind to deal with the danger. Hence demoniac intervention, with magical ceremonies, was enlisted, to oppose the all-powerful spirits of the dead. But because of the realization of 'wicked' and murderous desires within himself, primitive man tended to attribute similar impulses to others, and more especially to endow the forces of Nature with malignant designs against himself. The author assumes, therefore, that the idea of punishment—as evinced by this paranoid tendency of primitive thinking—preceded the idea of sin, which would then be a rationalization to explain the assumed anger of a world of demons!

On this basis, therefore, grew up primitive religious practices and sacrificial ceremonies. The demons were, by the same mechanism of projection, imagined to be motivated by the same lusts and desires as actuated mankind. Food, drink, young men and women, were offered to them to appease their wrath, stress being laid on the fact of renunciation; by forgoing their own desires the supernatural spirits are satisfied. This tendency survives to the present day in conventional mourning ceremonies, the abstention from diversions, the ostentatiously gloomy clothing, etc., and any departure from this is resented by the community lest the revenge and vindictiveness of the departed spirit be aroused.

So, too, the sufferer from a compulsion neurosis is, by his ceremonials, endeavouring to escape punishment for his evil thoughts. They have universally a penitential character: enjoyment is denied him: it is "as if the compulsion neurotic dictated penalties for himself . . . so that he might, as it were, be in a position to say to the revengeful demoniac powers. 'Now you may spare yourselves the trouble of doing me anything (*sic*). I have punished myself'".

G. H. F. G.

- [131] **Pleasure in sleep and disturbed capacity for sleep: a contribution to the study of the oral phase of the development of the libido.**—MICHAEL JOSEPH EISLER. *Internal. Jour. of Psychoanalysis*. 1922. i. 30.

FERENCZI considers that the sleep of a new-born child is a hallucinatory attempt to return to the protection of its mother's womb. This is an abstraction which is arrived at logically from psycho-analytic experience. Freud makes this abstraction clearer. "Sleep is somatically a re-activation of the sojourn in the womb, fulfilling the same conditions of restful posture, warmth, and absence of stimuli: indeed, many people assume in sleep the fetal attitude. The psychic condition of a person asleep is characterized by an almost complete withdrawal from his environment and interest in it." In another place Freud writes: "In the sleeper the primal state of the libido-distribution is again reproduced, that of absolute narcissism, in which libido and ego-interests dwell together still, united and undistinguishable in the self-sufficient self."

The writer agrees with these statements. His investigation of the problem, however, does not go back so far, but has, perhaps, a more practical interest. It is well known that in every infant gratification of the oral libido promotes sleep. This intimate association of oral gratification and need for sleep at the time when the individual has no other desire to appease must produce an exceedingly firm connection, with which nothing of equal significance in later phases of development can be compared.

The author discusses some interesting cases of insomnia in psychoneurotic individuals which suggest that the more active an individual has been in his oral phase, and the more energetically this stage of development has been later repressed, the greater is the chance that his ability to sleep will be affected by a pathological regression of the libido. The insomnia of melancholics, who, according to Abraham, fall ill in consequence of "repulse of a threatening relapse into the oral organization", finds its explanation in this relationship.

C. W. FORSYTH.

- [132] **Displacement substitution.** WILHELM STEKEL. *Psyche and Eros*. ii. 222.

In an interesting article, W. Stekel discusses this mechanism, and postulates that the phenomenon of transference occurring during the course of psycho-analytic treatment is only a special example of the general tendency to displace, upon an indifferent object, emotions the true nature of which the patient does not wish to realize. Amongst primitive people, and even

to-day in the uneducated, the belief is found that inanimate objects and bodily excreta, urine, menstrual fluid, etc., possess a mysterious potency, so that contact with them will transmit to another person the emotion which they symbolize. (Behind this lies the archaic concept of thought as a material entity). Thus lovers not infrequently drink each other's urine as a pledge of fidelity. A further stage of this process of displacement (*Verladung*) is seen in the Jewish ceremonial of the scapegoat, whereby the sins of an entire people are unloaded upon the goat and driven with curses and blows into the wilderness.

Amongst neurotics this reaction is most readily observed in cases where the incestuous love for one or other parent becomes displaced upon other members of the family or upon maids and menservants. Hence the well-known danger of servant girls and the *valet de chambre* to the sons and daughters of the family, but the displacement is so conditioned that they lose their attraction if they pass outside the family circle. "Analysts know of this phenomenon and call it transference. But transference . . . is only a special instance of displacement, and the term should be used only to describe the relations between the analyst and his patient during the course of a psycho-analysis. One notes during an analysis that patients save themselves from their transference upon the analyst by displacing the affects upon some other objects. They begin to collect (books, stamps, fans, pictures, etc.), fall in love, try to make new friends, or displace their emotion upon some object or other."

The analyst's comprehension of the patient's difficulties and fears leads to the hope that he may receive from him the love for the lack of which he has fled into neurosis. "This is the categorical sexual imperative which is obstinately linked up with a definite phantasy . . . if the physician understands me so well, he will know what I expect of the world and of him." Failure to realize this—in other words incomplete analysis of the transference situation—leads often to complete deadlock.

G. H. FITZGERALD.

[133] **The castration-complex.**—AUGUST STÄRCKE. *Internat. Jour. of Psycho-analysis*, 1921, ii, 179.

THE writer defines the castration-complex as a network of unconscious thoughts and strivings, in the centre of which is the idea of having been deprived, or the expectation of becoming deprived, of the external (male) genitals.

The author holds that one of the causes of the castration-complex is the result of an actual situation—the infant at the breast—in which a penis-like part of the body (the nipple) is taken from another person, given to the child as his own, and then removed. To him, then, the primary castration is this withdrawal of the mother's nipple from the infant who is not fully satisfied. The constancy of this at the weaning, and the fact that this may happen at each nursing, would account for the universal occurrence of this complex. The feeling of the loss of the nipple from the mouth in part remains, and finds gratification in smoking or in eating sweets: the rest is displaced downwards to the genitals. Reasons are

given for holding the view that on the castration-complex are possibly founded the infantile theory of the 'woman with a penis', many symptoms of neurosis, details of incestuous object erotism, particular forms of sadism, and that it also takes a part in the origin of the mechanism of projection.

The writer maintains that the difference between breast and bottle feeding is of great significance in the development of the mind. The duration of the sucking, the abundance or the scarcity of the milk, the kind of feeding-bottle, even the width of the opening, find their place in the history of the mental illness.

C. W. FORSYTH.

[134] **The spiritual significance of psycho-analysis.**—BEATRICE M. HINKLE. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii, 209.

THE aim of this paper is to show that in psycho-analysis we have a method which has the power of awakening in the individual those subjective experiences that make for psychic development. These are the experiences we call spiritual and which it has been the purpose of religion in all ages to call forth.

Psycho-analysis concerns itself with feeling and emotion, not that it may destroy them, but that it may give man understanding of them and thus lead him to greater power and freedom. By this means something is added to, not taken away from, man. True self-knowledge is not born of introspection, for this deals only with consciousness, while the springs of action lie buried in the unconscious. Only by overcoming 'resistance' and accepting these buried strivings can the personality become integrated and harmonious.

The greatest values of the personality may lie hidden in the crude forms prevented from development through repression, and only when this realization is gained can man begin to understand how the path to the highest lies through the midst of the lowest—that 'love was born in a stable'. Free will is not a free gift; indeed anything approximating to it can only be won by great sacrifice. The distinction between the religious and the psycho-analytic method is seen in their respective attitudes towards repression. In the former, repression is erected as a barrier concealing from man's consciousness the source of his hardly-won achievements. In the latter, repressions are relieved in order to allow self-conscious man to deal with his infantile wishes face to face and consciously to direct the application of his libido.

The author considers that Freud and Adler are each unduly stressing opposite aspects of the problem, and that their tendencies are purely reductive. She prefers to consider with Jung the prospective value of the libidinous and egoistical strivings. Though it is true that phantasy expresses a wish, it also embodies the possibility of a reality, for, as Jung says, "what great thing has there ever been that was not phantasy first?"

Psycho-analysis seeks to adjust the relations and attitudes of the human organism as a whole instead of one of its parts, and thus stands as a bridge between science and religion. The objectification of subjective experience still permits the spiritual significance of experience insisted

upon by religion. By affording understanding while life is yet full in man, psycho-analysis may avert the oft-heard tragic lament, "Now that I have learned something of how to live, it is time for me to die".

ALFRED CARVER.

- [135] The significance of psycho-analysis in the history of science.
—J. S. VAN TESLAAR. *Internat. Jour. of Psycho-analysis*, 1921,
iii-iv, 339.

IN a broad sense it may be said that psycho-analysis presents but an extension of the theory of evolution, an application of the principle of evolution to the study of mind. Freudian psychology has sounded the death-knell of static, descriptive, atomistic psychology, just as Darwinism has put an end to the pre-evolutionary biology. Freud's discoveries are doing for psychology what Darwin's have done for biology.

Darwinism has led to the theoretical assumption that in our physical as well as mental development we recapitulate the biological history of the race. The individual mind similarly recapitulates in the course of its growth the psychic unfoldment of the human race. Primordial cravings that persist are racial vestiges of the mind. Unlike, however, the embryonic organs which disappear, our primordial cravings persist in their raw and naked form alongside the more complex, subtle emotions, ideals, and aspirations we acquire in later life as the heritage of historic civilization. The racial instincts persist within us, and, as long as they are allowed to remain 'uncharted', compete with consciousness for mastery over our conduct. The instincts are never abandoned, they are only refined. Moreover they persist, and occasionally flare up in their 'original image'.

For the first time in the history of psychology we have now the key to the understanding of human behaviour in the light of its biological history. Through the exploration of the unconscious we have a scientific method for controlling our psychic energies and for outwardly directing their outward flow. Through psycho-analysis mental health, efficiency, human welfare generally—racial as well as personal—become subject to purposive direction and control, exactly as the forces of nature are to-day in the engineer's hands.

C. W. FORSYTH.

- [136] Some points about repression.—T. A. Ross. *Proc. Roy. Soc. Med.*, 1922, xv, 31.

BEFORE the war the writer seldom found a history of sexual trouble in psychoneurotics. Now, without being sought, there often comes a stream of material in the greatest conflict with the ideals of the personality, material which the patients clearly wish to discuss, though doing so overwhelms them with shame, and which in former days we were led to believe was repressed. People are more ready to discuss questions of sex than they were.

Ross, although believing that repression does occur, considers that many of what have been described as instances of repression are not so at all. Rivers has pointed out that it would be inconvenient to go about with

infantile memories, repression being commonly a very beneficial mechanism. In many cases revival of repressed memories may be actually hurtful. Many conscious, or at least preconscious, mental processes that have never been held in the focus of attention at the same time, that have been looked at from an unhelpful angle and have therefore been troublesome, can be readjusted and made unhurtful. The writer maintains that these, and not unconscious thoughts, are the commonly important factors in psychotherapy. The method of free association is a useful one for getting present troubles talked about and their readjustment effected. By no word or hint, however, should a single suggestion be given by the analyst.

The author holds, then, that much that passes for repressed material never was repressed, but was either merely out of the focus of attention, or put into the patient's mind by the analyst. The great stress laid on the unconscious has tended to do harm in two directions: (1) In making people conscious of many images which they would be better without; (2) In causing many things to be overlooked which might effect a cure.

C. W. FORSYTH.

[137] **A personal experience of the night journey under the sea.**—

JOAN CORRIE. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii, 303.

THE author sketches for us, by means of fragmentary analysis of her dreams during a certain period of mental stress, how she passed through experiences similar to those which are embodied in the myths and religious conception of primitive man. This she explains on the recapitulation hypothesis, assuming that as we progress through infancy and childhood to adult life we recapitulate the mental development of the race. It is claimed that during a 'psychological analysis' a person in the same way lives through ancestral experiences until he is, as it were, reborn. As in so many initiation ceremonies, a mimic death of the past and a rebirth into a new future form a conspicuous part of the ritual, so in dreams does our old man die to rise again as a regenerate hero. The libido sinks into the matrix, as the sun into the sea, only that it may return with renewed power on the morrow. Dr. Corrie, in relating and interpreting her own experiences, follows closely the symbolism and line of thought developed by Jung in his *Psychology of the Unconscious*. One gathers from the text that the experience was actually passed through while the author was undergoing psychological analysis with Dr. Jung.

ALFRED CARVER.

PSYCHOPATHOLOGY.

[138] **Study of a phobia.**—S. E. HOOPER. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii, 292.

HOOPER reports the analysis of a phobia for storms. Incidentally the description of the fear gives a vivid impression of the distressed state of mind experienced by the subject of such a phobia. Hooper in his analysis traces the constituents of the phobia, showing how fear for sudden and terrible attributes of the storm represented the terrifying aspects of sex as the latter had been presented to the patient in her life history.

He does not, however, consider that the analysis supports the Freudian theory, for he did not find that there was any sensuous gratification in infancy. The pleasure of a game of naked savages in which the patient and her brother used to indulge is ascribed to the delight of getting away from the restriction of clothing. Shame was only aroused because later, when the brother said that the game must be played in secret, the patient concluded that it was wrong. Again, the idea that there was any incestuous attachment to the admittedly dearly loved brother is repudiated, apparently because this was not of the full-blooded adult type. Hooper therefore states that "it seems difficult to bring this case under the category of repressed infantile sexuality", and thinks that "we must try to proffer some other explanation". In his opinion it was the great emotional disturbance engendered by an unfortunate love affair, as well as the childhood experiences, that were responsible for the phobia.

It is difficult to see how this is another explanation, but let us give the author's conclusions in his own words: "The factors in the phobia are (a) A hidden system of fear of the vague unrealized elements in the sex life which had originated in childhood and had become consolidated in adolescence; (b) A body of emotion left as a legacy from the subject's love episode; (c) The process known as transference of feeling or displacement. Cure was effected when the patient came to recognize that the storm symbolized sex passion in general. Presumably her resistance was resolved completely, for the recognition brought "an exquisite sense of freedom".

ALFRED CARVER.

[139] **A preliminary study of the precipitating situation in two hundred cases of mental disease.**—EDWARD A. STRECKER.
Amer. Jour. Psychiat., 1922, i, 503.

HEREIN a comparison is attempted between 100 cases of manic-depressive psychosis and 100 cases of dementia praecox from the standpoint of the significance of the precipitating situations and as to whether the organic or psychogenic aspects were more emphatic. An effort is also made to find how often and how clearly pre-psychotic emotional feelings were carried into the actual mental attack. The cases were unselected and were consecutive admissions. The tentative conclusions reached were:—

1. An important precipitating situation occurred in 25 per cent, influenza, overwork, exhaustion, the climacteric, and complicated childbirth being the most frequent somatic factors, and cruelty, poverty, illness or death of relatives, and unhappy love-affairs the commonest psychic problems.

2. Important exciting factors were 12 per cent more frequent in manic-depressive psychosis, and the absence of favouring circumstances was six times more frequent in schizophrenia.

3. The proportion of somatic and psychic factors was practically the same for manic-depressive and dementia praecox.

4. An extension of the pre-psychotic emotional tone into the psychosis was noted in 62.5 per cent of the manic-depressives where the situations were significant, but only in 21.6 per cent of the doubtful precipitants.

Among the schizophrenies the proportion was 30 per cent with important exciting factors.

5. Especially in manic-depressive insanity there was a tendency for adequate precipitating situations to be of longer duration than inadequate ones.

6. In manic-depressive psychosis, when the initial attack had serious exciting factors, later attacks were apt to show the same type of apparent causation.

7. The proportion of normal heredity was much higher in both forms of mental disease when serious precipitating circumstances were considered.

8. An abnormal personality occurred with greater frequency in those whose illness came on without adequate exciting factors. The percentage difference was 13 per cent for manic-depressive and 24 per cent for schizophrenia.

C. S. R.

[140] **Depressions: their causes and treatment.**—WILHELM STEKEL.
Psyche and Eros, 1922. iii, 65.

SUFFERERS from neurotic depression have a secret consciousness of guilt, the deeper motive of which only analysis can show. Wishes for the death of beloved kindred frequently occur, and one of the chief causes of depression is the termination of a secret incestuous hope. Mothers become ill when their children get married; fathers likewise. In melancholia all the 'disposition to love' is transformed into a 'disposition to hate'. The patient can only hate, and he hates himself. Depression is a neurosis of hate which begins with a disturbance in the love relationship. There is as a nucleus an unfulfilled wish (usually unconscious) which involves the bankruptcy of phantasies and the triumph of reality. The patient's whole affectivity is transformed into hatred, and finally he has only one object of interest—his own ego and his unhappiness. If through a period of indifference he can love again, he is cured. The self-reproaches are justified and the malady is a self-imposed punishment. Suicide is the penalty for having desired someone's death. The whole clinical picture shows a masochistic tendency. From self-torture a secret delight is derived, and men in this malady given an impression of femininity. Depressions begin with an augmentation of the homosexual component; probably owing to a disappointing heterosexuality, and from the hate and sadism engendered by hatred of the opposite sex many may resort to narcotics as a refuge. Periodic depressions Stekel regards as due to periodic alternation between homo- and heterosexuality. In depressive states, if the sexual impulse is not wholly quenched, there is a tendency to change the love-object, which is a spasmodic attempt at cure, that is, to get back to heterosexuality. Don Juans, nymphomaniacs, and satyriasts are really latent homosexuals. In treatment, hormones have proved wholly ineffective, but psychotherapy gives excellent results through positive transference if skill is used. In some cases psycho-analysis leads to quick results. Narcotic medication for insomnia is warned against, as sleeplessness is regarded as a protective measure against the pathological complexes.

Hydrotherapy is an invaluable adjunct, and patients should be persuaded to work to the best of their ability. Suicide does not occur during psycho-analytic treatment, for as long as the physician is clung to no threat is carried out. Treatment, however, is usually difficult, strenuous, fatiguing, and time-consuming.

C. S. R.

- [141] **An experimental study of the mechanism of hallucinations.**—
MORTON PRINCE. *Brit. Jour. Psychol. (Med. Sect.)*, 1922, ii. 165.

MORTON PRINCE has made a study of the mechanism involved in hallucination by means of tapping the 'subconscious' by automatic writing. For this purpose he obtained the co-operation of a patient whom he had previously treated for double personality. The subject was given a theme, provided with pencil and paper, and her head was covered so that she could not see the script. When during the writing an hallucination developed, the subject indicated the moment of its appearance by exclaiming 'picture', whereupon a mark was made upon the script. Likewise the moment the hallucination disappeared a second mark was made. Thus the words written during an hallucination could be identified and the two subsequently compared. In some cases as soon as the hallucination appeared, the subject was required to describe it orally while she continued with the automatic writing. After the experiment, the script and the record of the hallucination were arranged in parallel columns for comparison. Finally the method of 'subconscious introspection' was used to elicit further evidence as to the subconscious processes which were occurring during the writing of the script and the hallucination. By these means it was found that: (1) A short interval elapses after the script begins to describe an incident before an image (hallucination) develops. (2) The image which then appears in consciousness corresponds to the unconscious thought. (3) The images resemble those of ordinary conscious thought, although they may be more vivid and richer in detail. (4) The image is richer in detail than the description given in the script. (5) Continuity between succeeding images, which appear—as in a dream—to be without apparent relation to one another is found in the subconsciously written script.

'Subconscious introspection' further proved that the hallucination was secondary to and a product of the script-producing activities, not vice versa. Similar experiments were carried out with auditory hallucinations.

Morton Prince draws the following conclusions: hallucinations are the emergence into awareness of imagery belonging to subconscious thought. When hallucinations of this type occur in pathological psychoses they are indications of the activity of a dissociated subconscious process as a factor in the psychosis.

Thus the psychological problem of differentiating between normal imagery and hallucinations disappears, in that the mechanism of their production is identical. So-called hallucinations are only the normal imagery of dissociated subconscious thoughts.

ALFRED CARVER.

- [142] **Fantasies of childhood and adolescence as a source of delusions.**
—EDWARD MAPOTHER and J. E. MARTIN. *Jour. of Ment. Sci.*,
1922, lxxviii, 33.

In this paper the authors describe in detail a very interesting case of early psychotic derangement in which the mental content was mainly a morbid reaction to an earlier fantasy and in which the mechanism was unusually clear. Briefly, the patient presented the clinical manifestations associated with the dementia-præcox type, with, however, a tuberculous infection of the abdominal region from which she eventually died. On a background of a confusional, apathetic, stuporose attitude, the patient exhibited three distinct varieties of conduct: first, the performance of isolated impulsive acts and the making of disjointed remarks; secondly, there were outbursts of weeping with apprehension without any apparent cause; and, thirdly, there were phases of joyous and defiant excitement in which the patient was destructive, uncontrollable, and in which she poured out streams of obscene talk.

It was assumed that these phases were the outcome of the more or less well-recognized methods adopted in the presence of a cause for remorse so that the emotion engendered may find expression, i.e., the weeping phase was the direct reaction by grief, the excitement was the attempt to forget by over-compensation, and the disjointed actions and remarks were symbolic expressions of the same feelings. Later in the history of the case, the patient suddenly became confidential, no longer responded by the above-mentioned reactions, but poured out a coherent and circumstantial account of her life-history, involving continued incestuous experiences with her brother. This account was perfectly plausible, and formed an adequate basis for the explanation of the morbid symptoms; the experiences were therefore accepted as real, and it was with astonishment that the authors, on seeking corroboration from other members of the girl's family, found that the facts of the circumstances of the patient's life were in strong contradiction to her story. It was clear, then, that, previous to the development of the psychosis, the patient had been entertaining an incestuous fantasy. Four days after the original confidence she again talked of her life, and confirmed the details of her previous story, going on, however, to a further extent in which she exposed the very common foster-parent fantasy in regard to her mother. About a week subsequently, she developed her worst phase of excitement, and died from the exhaustion following it.

The authors discuss the material provided by the case, and they come to several conclusions. They feel that there is a need to distinguish between the form of a psychosis and its occurrence, that the onset of a mental disorder is determined by the conditions of the present, and that though the material elaborated in a psychosis is necessarily past, real or fantasy, experience, yet the occurrence of the psychosis is in the great majority of cases due to the intervention of something quite other than a mental experience. They regard the use of the special technique of psycho-analysis as unnecessary for the elucidation of past events relevant to the psychosis; in their experience such memories are always at the disposal of the patient,

but are not to be elicited readily because of the doubt in the patient's mind as to how they will be received. By getting the confidence of the patient they have found it quite easy in cases of psychosis to obtain by ordinary conversation and occasional question the sort of story the psycho-analysts lead one to expect. They feel that the main value of the psycho-analytic technique is that "it enables the neurotic instructed in regard to the 'unconscious' to save his face by deceiving himself that what is thus elicited is something foreign to his true self".

Other cases are then described more shortly, illustrating the use of other types of fantasy developments as forming the basis for the mental content of a psychosis.

T. B.

[143] **The anal-complex and its relation to delusions of persecution.**—OWEN BERKELEY-HILL. *Ind. Med. Gaz.*, 1921, lvi, 255.

FOLLOWING the Dutch psychiatrists Staercke and Van Ophuijsen, who incline to the opinion that all delusions of persecution can be traced back to the anal-complex, the author briefly cites two cases which display many exquisite manifestations of this complex associated with persecutory delusions.

In the first the male patient is persecuted by a priest by means of a telescope connected to his (patient's) head. The other end of the telescope is 'plugged'. 'Terrestrial' magnetism is thus conveyed, to the patient's annoyance. The priest has gone 'raving mad', has jumped into a basket, and in this he has been ever since, deprived of all food and drink and unable to get out. The patient believes that by scratching the back of his left hand with his right forefinger he can cause the priest to pass a copious motion into the basket, so that the floor is now "covered in filth, huge lumps and chunks of it". He can now therefore 'taunt' the priest, who is thus dominated. For years this patient has been a victim of severe constipation and largely indifferent to the defective action of his bowels. His delusions are the outcome of a prodigious anal-complex. The telescope (hollow tube) with a plug in it clearly expresses the constipated bowel. Further associations of ideas with filth are manifest in the 'dirty-clothes basket', as well as in the 'left' hand which evokes the bowel evacuation. In this case we are at liberty to assume that the patient's delusion enables him to avenge himself on one or other of his parents (the priest acting as a surrogate for the parent), by imagining himself to be in complete control of the action of such individual's bowels. The whole idea might be thus expressed: "I will now show you what it is like to be dictated to in the matter of the evacuation of one's bowels".

In the second case an elderly lady with persecutory ideas spends hours in collecting rubbish which she treasures as her 'jewels'. The bag for their reception is made in the shape of the lower intestine and rectum, with an opening puckered like an anus. She has special anal-erotic characteristics. She is extremely neat and orderly in her dress and possessions, and of the opinion that she has given birth to an incredible number of children.

C. STANFORD READ.

- [144] The goldsol test in mental disease.—P. W. BEDFORD.
The colloidal gold-reaction in the cerebrospinal fluid.—
W. WHITELAW. *Jour. of Ment. Sci.*, 1922, lxxiii, 54, 66.

THESE are two papers dealing with the technique, limitations, and nature of the colloidal gold reaction as applied to the cerebrospinal fluid. Both authors have carried out a series of tests on a number of fluids, normal and abnormal, and have compared the results obtained with those derived from other globulin reactions and the Wassermann reaction.

Dr. Bedford gives the following conclusions:—

1. That typical, well-marked reactions are obtained only in general paralysis, taboparesis, and juvenile paresis; and that the percentage of positive reactions is 95 in these diseases.
2. That normal fluids give negative reactions.
3. That the goldsol reaction is more sensitive than the Wassermann reaction, quite as reliable, and probably of more value in the early diagnosis of neurosyphilis.
4. That the test is helpful in the diagnosis of acute poliomyelitis.
5. That it may prove of more value in the diagnosis of congenital syphilis than any test hitherto employed.
6. That important points in its favour are: its simplicity, minimizing chances of error; its performance, occupying only a few minutes; and its need of but two or three drops of fluid.
7. That its chief drawback is the uncertainty of being able to prepare a good goldsol at every attempt.

Dr. Whitelaw summarizes as follows:—

1. The colloidal-gold reaction is a laboratory test, and can be performed rapidly with a minimal amount of cerebrospinal fluid.
2. Extreme care is necessary in the cleaning of glassware and the preparation of the reagents.
3. The paretic reaction occurs in dementia paralytica with great constancy, but is obtained in some other conditions, and so the results from a laboratory test such as this should only be considered in relation to the other evidence in the case, both clinical and pathological, as the tendency might be to depend too much on an unknown test of this kind at the expense of the other facts.
4. Wider use of the test should be made so that numbers will eliminate discrepancies.

T. B.

- [145] Research on the blood serum in certain mental diseases
(Ricerche sull'azoto non coagulabile del sangue in alcune malattie mentali).—A. FRIGERIO. *Riv. di Patol. Nerv. e Ment.*, 1921, xxvi, 301.

THE research was undertaken to determine whether any changes occur in the blood serum of psychotics such as might be expected from the frequency of changes in the liver and kidneys observed at autopsy.

The blood-urea was estimated by the hypobromite method, in units of urea per 1000 of serum, due care being taken to obtain a similarity of

conditions as to food, etc., in the cases observed. The blood-urea did not correspond to the amount of albumin in the urine, and furnished more useful information than the latter. It was found that in cases of pure uræmia, and in melancholia, the proportion of urea was low or moderate, but whenever confusion was added to excitement the proportion rose. In dementia præcox the proportion was always low. In alcoholic insanity, in arteriosclerotic dementia, and in other cases in which torpor or mental confusion were due to organic cerebral lesions, as well as in slowly advancing senile dementia, the proportion was moderate. In cases of confusion irrespective of the type of psychosis, the proportion was high. Blood-urea examination may be of considerable use in diagnosis, and high urea values may be regarded as bad prognostic evidence both as to life and mental recovery.

A discussion follows of the imperfectly understood relationship of uræmia, liver and kidney disease, and the influence of the sympathetic and endocrine systems on these organs. In addition to the above findings, the author concludes that confusion is the direct result of increase of urea in the blood.

R. G. GORDON.

TREATMENT.

[146] **The use of thorium X in mental therapy** (*Sur un essai du thorium X dans la thérapeutique psychiatrique*).—DADAY, BESSIÈRE, and JALOUSTRE. *Presse méd.*, 1922, xxx, 48, 520.

THE writers give the following results of their experiments with thorium X in the treatment of mental conditions:—

Melancholia	9 cases	No change.
Dementia præcox	4 ..	3 unchanged.

There was marked success in an early case of the latter disease, which was rapidly progressing towards chronicity, but whose symptoms cleared up so rapidly and completely that discharge from the asylum was possible in a very few weeks.

Confusional insanity, 3 cases. 1 unchanged.

In the other two cases the results were excellent. Improvement began in ten or twelve days, i.e., after the second injection, and both cases were discharged cured within five weeks, although the usual period required is seven or eight weeks.

The conclusions drawn were:—

1. Thorium X is inoffensive even in big doses during the first series of injections. (The technique includes two series.)

2. When thorium is going to be efficacious, the improvement shows itself after two or three injections.

3. The action seems to be nil in chronic cases, but definitely successful results were obtained in the three acute cases mentioned, warranting further trial of the method. The exact way in which thorium X acts is not understood, but the improvement is undeniable.

The technique consisted in giving five weekly hypodermic injections of an isotonic solution of bromide of thorium X, rest for one month, then

five more injections. The thorium is put up in ampoules which contain doses ranging from 10 to 1000 micrograms. It must not be forgotten that the radio-activity of thorium X diminishes by half in three days and progressively afterwards, until at the end of twenty days activity is practically gone. This in itself would appear to be a safeguard against the danger of cumulative effects. Injections of large doses (above 500 micrograms) produce a dark pigmentation of the skin in from three to five weeks, which disappears in three or four weeks by desquamation. During the first series of injections there was little reaction, local or general. During the second series there were nausea and vomiting in some cases and 'tendance lipothymique'. Pigmentation was more liable to occur as the result of the second series of injections. There was no accident in connection with one hundred injections.

JAMES YOUNG.

[147] **Magnesium as a sedative.**—PAUL G. WESTERN, *Amer. Jour. Psychiat.*, 1922, i, 637.

FROM experimentation on rabbits, Meltzer and Auer showed many years ago that the primary effect of magnesium upon nerve-cells was that of paralysis without any preceding excitation, and was seemingly exclusively inhibitory. It was thought, therefore, that it might be of value in excited mental states, and in this paper the results are given of the use of magnesium sulphate administered hypodermically in doses of 1 or 2 c.c. of a 25 or 50 per cent sterilized solution as a sedative in the Warren State Hospital. In all, more than 250 doses were given to 50 patients. Half of them were agitated depressions, 7 were dementia præcox, 4 were paretics, and there were one or two each of epilepsy, senility, organic dementia, and hysteria. One was actively manic, and all were more or less agitated. The result in nearly all cases was the same. The patient relaxed and slept from four to six hours. Some patients did not react at all. Of the total 250 doses, 30 were without effect. The most marked effect was obtained in simple agitated depressions. There was no opportunity to give the salt to a sufficiently large number of very active, excited patients to know whether it is of value or not.

C. S. R.

Reviews and Notices of Books.

Foundations of Psychiatry. By WM. A. WHITE, M.D. With an Introduction by DR. STEWART PATON. Royal 8vo. Pp. 136 + ix. paper covers. 1921. New York and Washington: Nervous and Mental Disease Publishing Company. \$3.00.

WE have within these very instructive pages a highly successful attempt to formulate a wide viewpoint of psychiatric principles from their biological, psychobiological, and sociological aspects. Mental phenomena are interpreted and correlated with the principles of science which have been worked out in other fields. The keynote of the author's thesis is that "disease is only a manifestation of that dynamic interplay between organism and environment when, for the time being at least, the balance is on the wrong side of the ledger." The separatist view of mind has for long hampered our progress in our conception of mental disease, and the unity of the organism is insisted upon as a necessary approach to the subject. From the biological point of view White shows how integration has taken place at every evolutionary level, and how structure has arisen through organized function, tending to ever-increasing individuation of the organism. The facts, however, at any level of integration need to be explained, and can only be fully explained in terms of that level. These principles are fundamental to an understanding of the psyche with its dynamic urge, and "psychiatry must interest itself with a longitudinal section of the individual which shows how a given type of personality make-up has reacted to a given type of stress." Conflict and ambivalency are universally seen, not only at the psychological level, but at all stages of development. The wish at the psychological level is taken as the unit of consciousness. In insanity it is the *individual-society relation* which is involved, and, as Sherrington has lately pointed out, psychology can never be explained in terms of neural processes.

White discusses the concepts of Janet, Freud, Jung, Adler, and Kempf, and endeavours to correlate their various viewpoints. Adler's and Kempf's work are both much appreciated, as they brought a needed emphasis to the organic side of the psychiatric problems: and Kempf's mechanistic and dynamic classification of the neuroses and psychoses is given as an illustration of the importance of focusing the attention upon the process rather than etiological factors or pathological lesions. Briefly, the broad principles involved in therapeutics are dealt with, and the concept of sublimation towards a higher social integration is touched upon. A pragmatic and teleological attitude is adopted throughout, and a neurosis or psychosis is regarded as "an expression of the blocking of the instinctive tendencies

of the individual because they cannot become assimilated to his conscious purposes, or the energy they contain be utilized in forward living activities."

We regard this monograph as an excellent and valuable presentation of a viewpoint which admirably sums up the principles upon which the study of psychiatry should be founded. Any student of mental medicine will do well to absorb its contents, so that he may recognize at an early stage the sterility of the merely descriptive aspect of his studies which has for so long hampered progress in this branch of medicine. The book, however, should be read by everyone whose interest lies in humanity's strivings. It constitutes a highly worthy successor to the author's previous contributions on such problems.

C. STANFORD READ.

A Psycho-analytic Study of Psychoses with Endocrinoses. By DUDLEY WARD FAY, Ph.D. Nervous and mental monograph series. No. 33. Royal 8vo. Pp. 122 -- vii. Paper covers. 1922. New York and Washington: Nervous and Mental Disease Publishing Co.

It is an endeavour to discover if there was any correlation between certain endocrine disorders and special psychotic syndromes, twenty-two male patients in St. Elizabeth's Hospital, Washington, were studied by the author and his assistants for six months. No selection was made on the basis of mental disorder, but the group had in common only some kind of imbalance of one or more of the ductless glands. Since the pathology of psychotic disorders is in so many directions obscure, work which will throw any light on the problem must be specially welcomed. The discoveries of the internal secretions of the body, and the part they play in the emotional spheres more especially, have led some observers to see herein the key to all mental deviations, and though there are excellent reasons for recognizing in the interplay of hormones a factor which must by no means be neglected, we must be on our guard not to mistake cause for effect or speculate wildly with knowledge which at present is scanty and doubtful in many of its applications. Intensive study as here undertaken can only be productive of good when so scientifically carried out, for, as Dr. Fay shows, up to the present little work on such lines has been attempted.

Certain observations made by Mott, Kojima, Rossi, Prior, and Laignel-Lavastine are quoted, and both Cushing and Jelliffe have pointed out that the psycho-analytic school should take cognizance of these endocrine factors in dealing with infantile complexes. In drawing any conclusions from the results of therapy, the three forms of treatment here more or less simultaneously undertaken have to be taken into account. Only in two cases can it be thought that occupational therapy lent any aid towards improvement or cure, but it is well shown that any mental improvement or regression is quickly mirrored in a patient's work, which therefore becomes a valuable indicator of his condition. With regard to glandular therapy, almost every case was stimulated, some having their trouble increased, but most receiving some benefit. There was a decided increase of interest in the environment in a few, and a forced extroversion was also noted. In

one case the effect was spectacular, but in the large majority of cases any improvement was only temporary. Nevertheless the author is led to believe that gland feeding may be of value in breaking the vicious circle of mental disease, and that thyroid stimulation with psycho-analysis may be an excellent method of attacking incipient schizophrenia. Though psycho-analytic treatment showed no conspicuous results, mainly from the conscious and unconscious resistances met with, which it could not adequately overcome, it is thought that benefit may accrue in certain types. Every case was schizophrenic or had schizophrenic features, with evidence of submyxœdema, hyperthyroidism, or hypoadrenia, and one with dyspituitarism. Two simple schizophrenics were both submyxœdemic, while two cases with features of circular insanity had hypoadrenia. The hyperthyroids as a whole seemed more extroverted than the others.

From these findings it is patent that there is nothing epoch-making about this monograph; but the few facts elicited are of interest and value, and should stimulate further research on similar lines. The main content of the book consists of detailed case histories from which the reader may well judge of the mental material here dealt with. Such individual study and treatment is always gratifying to note, and we have nothing but praise for Dr. Fay's progressive and broad-minded psychiatric attempts.

C. STANFORD READ.

The Symptomatology, Psychognosis, and Diagnosis of Psychopathic Diseases. By BORIS SIDIS, A.M., Ph.D., M.D., Medical Director of the Sidis Psychotherapeutic Institute. Pp. 448 + xix. 1921. Edinburgh: E. & S. Livingstone. 21s. net.

IN this very interesting volume, Dr. Sidis records his views, based on a lengthy experience, of the treatment of the psychopathies. Briefly, his thesis is that all psychopathic disturbances are to be ascribed to two factors: an actual emotive experience, or series of such, occurring in the life of the patient, and an innate failure of the total integrative function of the mind, or, physiologically speaking, the nervous system. The actual mechanism involved in the disturbance is a dissociation which leaves a system of ideational emotive complexes free in the subconscious and acting independently of the main mass of the personality, and any treatment, to be successful, must aim at the elucidation of the disturbing complex. So far, these views are not at variance with the generally accepted conception of psychological disturbance as a whole: but the whole subject is treated in a rather arbitrary fashion from this very limited point of view, and one fails to find any reference to other modern conceptions, such as, on the psychological side, to any other mechanism or to personality response, etc., or, on the physiological side, to such factors as the relation of the endocrine system to the mental state.

The first portion of the book is devoted to a detailed description of different states of dissociation or suggestibility, normal and pathological, which the author has determined, and to which he applies such terms as the hypnotic state, the hypnoidal state, hypnolepsy, etc., and he adduces an interesting theory that the hypnotic, the normal sleeping, and the fully

waking state are to be regarded as possessing a common meeting-ground in the hypnoidal state, which is, to all intents, that condition of acquiescent relaxation aimed at in the technique of the method of free association. He regards this state as the primitive rest state, and considers that both the hypnotic and the normal sleep states are evolutionary developments from it. It is in this state that he investigates his patients, and by means of which he obtains access to the subconscious material.

The second portion is descriptive of the main symptomatology and classification of the various psychopathic disorders, and here, as Dr. Sidis takes little or no account of any other viewpoint but his own, one finds many divergencies from the generally accepted, and one is unfavourably impressed by the omission of much that is certainly known in regard to such matters, for example, as the true significance of a delusional content, or of an hallucinatory phenomenon.

The remainder of the book deals with diagnosis and with what the author terms psychognosis, which is apparently purely an analytical understanding of the case.

Of the three appendices, one gives a scheme for the examination of a patient, and the two others are reprinted critical essays on the author's views and treatment, by Dr. T. W. Mitchell and Dr. T. B. Robertson respectively.

As a record of investigation and practical experience, the book is stimulating and of value; but it is vitiated by a lack of definiteness in the treatment of the subject matter, by an irritating and unnecessary amount of repetition, and by a very persistent and open denunciation of any viewpoint which may be ascribed to the analytical school of thought: in regard to this the introduction constitutes a veritable polemic.

THOMAS BEATON.

The Psychology of the Criminal. By M. HAMBLIN SMITH, M.A., M.D., Medical Officer of H.M. Prison, Birmingham; Lecturer on Criminology in the University of Birmingham, and at Bethlem Royal Hospital. Crown 8vo. Pp. vii + 182. 1922. London: Methuen & Co. Ltd. 6s. net.

THE writer is an experienced and enthusiastic criminologist, and through his psycho-analytic studies he has been led to apply Freudian principles to the elucidation of the manifold problems involved in anti-social conduct. This book shows the result of his investigations, and demonstrates an endeavour to stimulate a more scientific viewpoint on the subject. Briefly, theories of crime, criminality, punishment, and the problems of responsibility are sketched out, and psychology is looked to as a science of human conduct to throw light where darkness previously reigned. The various physical factors which may militate against social adaptation are pointed out, and the examination of the offender's conscious mind is dealt with at some length. As is commonly the case, each experienced investigator tends to be dissatisfied with many of the established mental tests, and Dr. Hamblin Smith, after prolonged experimentation, has evolved a scheme of his own which he describes. One-third of the contents is devoted to an

exposition of the theory and practice of psycho-analysis as it applies to criminology, and later the various classes of offenders are superficially discussed. Finally, he states the conclusions which must necessarily follow upon his previous arguments, shows where society has gone astray in its dealings with the criminal, and draws attention to the possibilities of the prevention of delinquency and the factors which would aid reformation. The study of the individual offender is the great plea herein, and it is truly seen that society's reaction to its victims also has much to answer for. That every society has the criminal it deserves, and that crime is a social disease, are scientific and sane conceptions. Though some of the hopes herein expressed may be regarded by many as rather Utopian, it is certain that Dr. Hamblin Smith has given expression to views which will be more and more widely accepted by future generations. He in no way excuses crime, but insists on the application of modern psychological knowledge for the prophylaxis and treatment of criminal delinquency. Nothing but good can accrue from the reading of these pages, where the author's views are so clearly presented to all classes of intelligent readers.

C. STANFORD READ.

The Psychology of Misconduct, Vice, and Crime. By BERNARD HOLLANDER, M.D. Pp. 220. London: George Allen & Unwin Ltd. 7s. 6d. net.

MOST books on vice and crime have been written by persons connected with courts and prisons. This volume claims to be the outcome of twenty-five years' private practice, during which time "a large number of people suffering from character defects leading to moral failings" have come under the author's observation and treatment. It contains a description of human instincts and an analysis of human motives, but the treatment of these subjects is far too superficial to be of real value.

The author puts much stress upon cranial injuries as causative factors of crime. He lays down a system of cranial topography in connection with crimes of various kinds, and on this subject he makes most sweeping assertions, which equal those made by the more fanatical followers of Lombroso, and would not be accepted to-day by any criminologist of experience.

The book contains a discussion of the problem of 'criminal responsibility'. The author would appear to be in favour of the 'self-control' test. If this were made the official criterion we should have just as many acrimonious disputes as is the case with the present legal dicta. The author's views upon the absolutely fundamental question of determinism are not clear. Dealing with the subject of 'moral imbecility', the author would appear to accept the existence of a 'moral sense', as apart from the intellect. We are surprised to learn that he does not admit a particular cerebral location for this supposed sense. He speaks of immorality and crime as "departures from what the universal consent of mankind admits that conduct ought to be". There is, of course, no such universal consent. The author states that "moral weakmindedness" (we presume he refers to moral imbecility) "is legally recognized up to the age of sixteen under the

Mental Deficiency Act". The Act contains no such limitation. It would be possible to certify a moral imbecile at any age.

The volume cannot be regarded as a satisfying contribution to the problem of misconduct and crime. G. AUDEN.

Psychology: a Study of Mental Life. By ROBERT S. WOODWORTH, Ph.D., Professor of Psychology in Columbia University. Pp. 580 — x. 1922. London: Methuen & Co. Ltd. 8s. 6d. net.

The Foundations of Psychology. By JARED SPARKS MOORE, Ph.D., Associate Professor of Philosophy in Western Reserve University. Pp. 239 — xix. 1921. London: Humphrey Milford, Oxford University Press. 12s. 6d. net.

AT the moment Professor Woodworth's new book is probably the best introductory manual upon psychology. It is based upon a mimeographed edition which was for two years in use in the University classes conducted by the author and his colleagues, and the revision of that earlier version appears to have been the result of a co-operative enterprise in which both students and teachers have shared. The resulting volume demonstrates that this is an excellent way to compile a clear and compressed text-book for the beginner. The only blemishes are the frequent lapses into colloquial phrases, which must sometimes irritate the English student, though they may delight and stimulate the American freshman. Seeing that, when Professor Woodworth was an English lecturer, he spoke and wrote in a style which was never undignified, we may perhaps attribute these incongruities to the more youthful of his collaborators.

The earlier portions of the book deal mainly with what used to be termed physiological psychology and experimental psychology respectively; but the student is speedily introduced to the concept of behaviour; and, significantly enough, instincts, emotions, and feelings are discussed before the several senses are analysed. Brief sections are inserted upon psycho-analytic mechanisms and upon Freud's theory of dreams and unconscious wishes—"not", however (as the writer quaintly and correctly remarks), "that Freud would altogether O.K. our account of dreams".

Professor Moore's volume on *The Foundations of Psychology* is designed to serve a double purpose: first, as a manual for advanced courses in general psychology, and, secondly, as a book for the general reader interested in the nature and methods of mental science. It is divided into three main sections, which deal successively with the definition, the field, and the postulates of psychology.

To the student the concluding chapter, upon theories of the sub-conscious, is of special interest. Professor Moore here follows the view put forward by Bernard Hart, describing the latter's contribution to the subject (Hart's chapter in the joint volume on *Subconscious Phenomena*) as being "probably the best essay on the subconscious that has ever been written".

In an interesting scheme, Professor Moore proceeds to reconcile the views of Freud and Morton Prince both with each other and with his own

particular theory. Morton Prince's 'co-consciousness' he considers to be simply a dissociated state of personal consciousness. Freud's 'fore-conscious' he identifies with the 'ultra-marginal' level of the mind (that is to say, conscious states which are not only outside the field of attention, but even beyond the margin of personal consciousness). Freud's 'unconscious' he regards as a dissociated portion of the same ultra-marginal level. Thus, for Professor Moore, the 'fore-conscious' and the 'unconscious' together make up what he terms the 'subconscious'.

CYRIL BURT.

Beyond the Pleasure Principle. (The International Psycho-analytical Library, No. 4.) By SIGMUND FREUD, M.D., LL.D. Translated from the 2nd German edition by C. J. M. HUBBACK. Medium Svo. Pp. 90. 1922. London: George Allen & Unwin, Ltd. 6s. net.

IN this work Freud re-examines certain psychic phenomena, both normal and pathological, which cannot be explained by the pleasure-pain principle. He follows Fechner's definition of pleasure and pain as being conditions of stability and instability respectively. He recognizes the warring of all the particular instincts in their search for stability in a comprehensive ego, and points out, as he has often done before, that many neurotic and other manifestations may be explained as the effort of these impulses, especially sex, to achieve pleasure in face of the reality principle. Beyond this, however, he finds himself forced to recognize a repetition compulsion which does not and cannot achieve pleasure, to explain certain phenomena such as the dreams of the 'shock neuroses', amongst which he includes most of the war cases.

He recognizes the selective and time-space reference functions of the higher (cortical) levels of mind which raise a barrier in respect to stimuli from without, but points out that there is no such barrier against overstimulation from within. These stimuli are chiefly concerned with the feeling of pleasure and pain, and it is an effort to establish barriers against these which determines projection. The traumatic neuroses are considered as being due to the breaking down of the barrier against external stimuli. The final armament of this barrier is apprehension, which charges the defences against assault, and the dreams of these traumatic cases are not wish fulfilments but efforts to re-establish this apprehension, and with it the barrier against stimuli without which the pleasure principle cannot act. These dreams then, together with those of the psychic traumata of childhood, are dependent on the repetition compulsion. This repetition compulsion is regarded as an example of a deep-seated organic 'law' which is illustrated by heredity, the migration of birds, etc., and which many of the instincts subserve. Freud concludes that the tendency of instincts is essentially towards conservative repetition of previous states: the sexual life instincts towards continual recurrence of the starting-point of development, and the rest towards death, though the path to death is continually modified and elaborated by the reactions of the environment. The apparent impulse to progress in certain human beings he attributes to the constant demand for satisfaction in the shape of return to primitive states and the

resistances offered by reality. These resistances force the individual continually to try new paths, and thus impel him to change and experiment. The tendency of life processes is to lead to a stability, a relaxation of tension to pleasure, and so to death; but the process of conjugation introduces a new stimulus mass, and so leads to increase of tension, i.e., to life.

Admittedly in this study he leaves many loose ends to be followed in the future; but it is a remarkable development from the narrow and cramped standpoint of the past. Psycho-analytic investigation, if followed out on these lines, which permit of a much more biological interpretation than has ever before been possible to the strict Freudian, is likely to lead to much more general acceptance and a wider range of utility. The author is inclined to over-emphasize his apology for a change of view; but most will agree that this is a sign of grace rather than a reason for censure.

R. G. GORDON.

Suggestion and Common Sense. By R. ALLAN BENNETT, M.D. (Lond.), M.R.C.P. Pp. 105. 1922. Bristol: John Wright & Sons Ltd. 6s. net.

A CYNICAL remark made by the late Dr. Mercier twenty years ago has affected the author to such a degree that he regards psychology as a 'strange doctrine' and has shunned it ever since. This is perhaps not the ideal attitude in which to approach the subject of suggestion, and within these pages there is little which is worthy of perusal. In the first chapter, on "Psychology and Organic Life", a broad and rational viewpoint is taken on the conception of mind. The organism is viewed as an integrated mass of differentiated cells in which special groups have their own psychological possibilities. When, however, suggestion (all suggestion being regarded as self-suggestion) is dealt with, the lines of Baudouin are more or less strictly followed, and we cannot see that 'common sense' dissociated from well-established modern scientific knowledge will aid any psychotherapeutic advance. Psycho-analysis for Dr. Bennett is anathema, so that he thinks that patients requiring such a form of treatment were 'better dead'! The trend of the book is somewhat retrogressive, and it can hardly be considered useful either from the theoretical or practical standpoint.

C. S. R.

Psycho-analysis and the Drama (Nervous and Mental Disease Monograph Series, No. 34). By SMITH ELY JELLIFFE, M.D., and LOUISE BRINK, A.B. Royal 8vo. Pp. v + 162. Paper covers. 1922. New York: Nervous and Mental Disease Publishing Co. \$3.00.

HEREIN nine dramatic plays which have been presented upon the stage in recent years are analytically examined. Such a study vividly illustrates the various unconscious conflicts and solutions to such conflicts which the drama portrays, and renders such human problems clearer. The drama is looked upon as a useful and ready outlet for too severely restrained emotions, and also as allowing a constructive representation of these. Theatre attendance therefore acts as a relief to mental repression, and helps in the recognition of vital factors within. The authors regard stage art

as important to the physician for a clarification of his understanding of mental life, and he should recognize such artistic productions as direct aids to patients whose psychic burdens he would alleviate. These studies have previously appeared in separate form, but their collection in one volume is welcome, and anyone interested in emotional problems will be amply repaid by reading this book.

C. STANFORD READ.

Leonardo da Vinci: A Psychosexual Study of an Infantile Reminiscence. By PROFESSOR SIGMUND FREUD, M.D., LL.D. Translated by A. A. BRILL, Ph.B., M.D., with a Preface by ERNEST JONES, M.D., M.R.C.P. Pp. 130, 4 plates. 1922. London: Kegan Paul, Trench, Trübner & Co. Ltd. 12s. 6d. net.

THIS is an English reproduction of the American translation of Professor Freud's study of a childhood reminiscence of Leonardo. The work is already too well known both in the original and in the translation to call now for any detailed criticism. It is sufficient to say that it is a luminous application of the psycho-analytical method to the mental life of a genius long since dead. By showing how the most recent psychological knowledge can be successfully applied to unravel the unconscious influences which shaped the lives of the great ones of the past, it opened the gateway into a field of surpassing interest and fascination. Since the book was first published, other writers have followed this lead of Professor Freud, and we already have psycho-analytical studies of several outstanding personalities of earlier days, though none can compare with *Leonardo da Vinci* either in brilliant utilization of apparently trivial detail or in comprehensive elucidation of character.

A publisher's note informs us that the edition has been reproduced from the American edition by the newly-invented Manul process. It cannot be said that the reproduction shows the process to advantage. On every page of the copy sent us the print is blurred and trying to the eyes. Comparison with a copy of the American edition, with its clear well-cut type, only emphasizes its imperfection. On the other hand, the process enables the book to be marketed here at 12s. 6d., as against the American price of \$5.

D. F.

Practical Psycho-analysis: an Introductory Handbook. By H. SOMERVILLE, B.Sc., L.R.C.P., M.R.C.S., Senior Medical Officer, Whinney House Hospital, Demy 8vo. Pp. x + 142. 1922. London: Baillière, Tindall & Cox. 6s. net.

THE title of this book is essentially a misnomer, for the contents are concerned with psychological analysis as applied to the neuroses of war, though Freudian theories and principles are discussed. It is earnestly to be hoped that no reader will regard himself in any way competent to practise psycho-analysis from its perusal, for the 'hints on how to do a psycho-analysis' (Chapter X) really demonstrate how such a therapeutic method should not be carried out. Psycho-analysis is *not* psychological analysis. This

small work can only be of use to those who seek some added insight into the treatment of some neurotic war disorders.

C. STANFORD READ.

Expressionism in Art: its Psychological and Biological Basis. By DR. OSKAR PFISTER. Authorized translation by BARBARA LOW, B.A., and M. A. MÜGGE, Ph.D. Pp. 272. 1922. London: Kegan Paul, Trench, Trübner & Co. 6s. 6d. net.

GRAPHIC expressionism is defined by the author as "subjective presentation accompanied by total or almost total distortion of nature to the point of unrecognizability, or by suppression of all external reality". The main bulk of the volume is devoted to the study of the dreams, phantasies, and drawings of an artist who came to Dr. Pfister to be treated by psycho-analysis for fits of depression. In much detail are demonstrated the various psychological factors involved in the analysis of the expressionistic pictures, and how these were correlated with his symptoms and biological strivings. The rest of the book is taken up with an endeavour to see how far the observations made in a single case applied to expressionistic art generally, followed by a discussion on its psychological and biological background. Infantile attributes, identification, and autism are seemingly frequent; there is an over-emphasis of the ego, so that reality is devaluated and the chaos in the pictures betrays the confusion of the expressionist himself. It is introversion-painting, and the artist paints from inner necessity to create an outlet for his distress and to satisfy his instincts. The expressionist's world is the expressionist himself as *the* world; but by addressing himself to the public with his pictures he endeavours to escape introversion and to maintain himself with reality. The danger of mental derangement in some of such artistic types is grave; but the non-psychopathic expressionists possess, besides their art, a sufficient number of bridges to span the abyss between the ego and the external world. The contents of this book are of decided interest, but a good deal of psycho-analytic knowledge is requisite for its understanding.

C. S. R.

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Original Papers.

THE PATHOLOGICAL ANATOMY OF THE DUCTLESS GLANDS IN A SERIES OF DEMENTIA PRÆCOX CASES *

By M. E. MORSE BOSTON, U.S.A.

THE question of the possible relationship of the ductless glands to dementia præcox has been very much in the foreground recently. This is due to the growing realization of the importance of the endocrines both in the normal life of the individual and in various pathological conditions, and more specifically to Mott's¹ studies, on which he has based his theory of a primary regressive atrophy of the gonads in dementia præcox. Considerable work, both clinical and anatomical, has been done on the subject by other investigators, with no clear results. Attention has centred chiefly on the reproductive glands, more especially the testicles, although there have been some isolated studies on the other endocrines. The trend of this work has been rather against any close connection between endocrine disorders and dementia præcox. Nevertheless, statements that such and such a condition has been found in so many cases of dementia præcox and inferences drawn therefrom continue to circulate through the literature. A revision of the subject, in both its clinical and pathological aspects, and in the light of recent researches

* From the Pathological Laboratory of the Psychopathic Hospital, Boston, Mass., U.S.A.

on the functions of the endocrines, is needed to determine just how much evidence there really is of a specific relation of disorders of the ductless glands to dementia præcox. The present study is a contribution to the pathological side of the question.

It is evident that the question must be studied and the actual results interpreted from a broader standpoint than has sometimes been done. Simple tabulation of the conditions found in a series of autopsies on dementia præcox patients is futile. Even if the glands are abnormal, as they very frequently are, it does not prove that there is any connection between the endocrine lesion and the mental disease. The gonads and other ductless glands of a dementia præcox patient may be markedly atrophic owing to causes quite apart from the psychosis.

Aside from the mental disease the main factors which must be considered in evaluating the condition of the glands are the age of the patients, the state of nutrition, and the nature and duration of the terminal disease. Until these forces are allowed for, any abnormalities which may be present cannot be laid to the mental disease *per se*. It would seem that previous studies have not emphasized this point sufficiently. Frequently, too, it is impossible to say whether or not a given histological picture is normal. We have a general idea of what the ductless glands should look like, but no normal standards even approaching exactness for the different glands at different ages, and in varying conditions of bodily nutrition and function, nor for the finer changes produced in them by diseases of the other organs.

In reviewing previous studies on the possible relationship of disorders of the ductless glands to dementia præcox it seems to the writer that the objections to be made to some of them are, in the first place, as has been said, that there has been no allowance for factors other than the mental disease; and, secondly, that the cases have been insufficiently controlled. Either no control observations have been made, or cases suffering from other forms of mental disease or clinical cases of diseases of the ductless glands have been used for controls.

The most logical controls for estimating the possible relationship of disorders of the ductless glands to the psychosis are non-mental—cases of approximately the same ages dying of the same somatic diseases. They are obviously particularly necessary for those cases of dementia præcox in which the glands are inactive or show some pathological condition. In the present study we have made an effort to get such control cases from general hospitals, but it is quite a difficult and laborious task, and we have not yet succeeded in ‘matching up’ all our cases. It was thought, however, that a small number of cases studied critically and intensively in this way would be of greater value than merely a report of the findings in a larger series.

METHOD.

Cases under forty-five years of age were selected, whose histories were sufficiently characteristic to make the diagnosis reasonably certain. Most of the patients had been in various State hospitals in Massachusetts for periods up to twenty-one years. A few were acute patients who were treated at the Boston Psychopathic Hospital. The autopsies were made by Dr. M. M. Canavan, Pathologist to the Massachusetts Department of Mental Diseases. Only those cases were included which had a negative Wassermann reaction and no disease of the pelvic organs.

The glands studied were the gonads, pituitary, thyroid, and adrenals. Several blocks were made from each testicle and ovary. The pituitary was cut so as to include both anterior and posterior lobes in the sections. One section was made from each adrenal and usually several from the thyroid. The paraffin eosin-methylene-blue or hematoxylin-eosin method was used.

The findings in the ductless glands were studied in connection with the history of the patient, the duration of the mental disease, the degree of mental deterioration, the nature of the terminal disease, the state of nutrition, and any data given in the history on the sex life; also any indications in the physical examinations of anomalies that might be due to endocrine disturbances. Unfortunately information on the last two points was always meagre.

Twenty-seven cases, twelve male and fifteen female, were studied in this way. Summaries of the histories and of the findings in the ductless glands are appended to this article.

I. THE SEX GLANDS.

These were studied first, as discussion centres around them at present, and also because, in the testicle at least, histological changes are more readily detected than in the other ductless glands, and it is easier to exclude adventitious influences. The two functions of the gonads, the production of germ cells and of an internal secretion, must be considered somewhat separately.

The most valuable cases for demonstrating the actual uncomplicated conditions in the glands in dementia præcox are those in which the patient died suddenly without antecedent somatic disease. There were four such in the present series, two men and two women. One man, aged thirty-one (case 1), died from œdema of the glottis, due to knotting a towel around his neck during an excitement. The testicles showed scanty spermatogenesis. The duration of the mental disease had been about a year.

The testicles of a man of thirty-five years (case 2), who died during a katatonic excitement, showed very abundant spermatogenesis, also

numerous interstitial cells. The mental disease had been evident for only a few weeks.

Both the women patients (cases 13 and 14) were forty-three years old. One had been in the hospital eighteen months, the other seven years. The first committed suicide by hanging; the second died of asphyxia from aspiration of vomitus. A corpus hæmorrhagicum was present in each case. Primordial follicles were scarce, as would be expected at that age. No controls to these cases, i.e., sudden deaths in mentally normal persons of these ages, have been obtained. The striking point, however, is that in three out of four of these cases of sudden death in dementia præcox patients the gonads are normally active.

a. The Testicles.—The effects of various influences on the gonads are most complicated. The reaction of the testicle to experimental conditions has been studied more than that of the ovary, as it is a simpler gland, both anatomically and physiologically, than the latter, and its state of functional activity is more easily gauged histologically. A glance at some of the recent work on the subject, both experimental and anatomo-pathological, will illustrate the complexity of conditions. It is relevant also because similar influences may determine to a greater or less degree the state of the glands in dementia præcox subjects.

The testicle is very sensitive to a variety of pathological influences. Mere cessation of spermatogenesis is not necessarily abnormal, as it occurs when it is necessary for the body to conserve its energy, as in fasting and hibernation; but when it is combined with pathological changes in the germinal epithelium and connective tissue it is significant.

The effects of inanition and vitamin deficiencies have been studied by several authors. Lipstein² found that acute inanition in adult rats produced stoppage of spermatogenesis and degeneration in scattered tubules, and that re-feeding resulted in re-establishment of spermatogenesis and hypertrophy of interstitial cells. Allen³ fed rats on a diet deficient in water-soluble vitamin and produced in the testicles a total degeneration of all germ cells and a hypertrophy of interstitial cells similar to that caused by the *x*-ray. McCarrison⁴ in his study of the pathology of deficiency disease found in beri-beri pigeons a profound atrophy of the reproductive organs, accompanied by a true hypertrophy of the adrenals, with a proportionate increase of adrenalin. The testicles, ovaries, thymus and spleen atrophied out of all proportion to the other organs. The same changes were associated with inanition. Certainly the effect of inanition in causing degenerative processes in the ductless glands must be considered in those patients with dementia præcox who have been tube-fed for long periods, or who have died of wasting diseases. Minor deficiency conditions also are probably not uncommon among chronic mental patients, although they are not

often diagnosed as such. It is quite well recognized, clinically, that a fairly normal level of nutrition is necessary for the functioning of both testicle and ovary.

Taken as a whole, the results of experimental work on the testicle demonstrate that a similar physiological condition may be produced by widely different means, for example, by the *x*-ray, inanition and vitamin deficiencies, by ligating the vas deferens, and by eliminating the sympathetic supply.

Some interesting work has appeared recently on the reaction of the testicle in acute diseases. Mills⁵ studied MacCallum's material of epidemic pneumonia from the army camps. Although there was no striking gross change, there were marked microscopic lesions, a cessation of activity in the seminiferous tubules, frequent degenerative changes, and in late cases the beginning of fibrous replacement of the degenerated tubules. The severity of the injury corresponded directly with the duration of the pneumonia. Wolbach⁶ notes that severe toxic lesions in influenza seem to be confined to the muscles and the testicles.

Meleney⁷ examined the testicles in thirty-eight cases of acute infections (lobar pneumonia, typhoid, peritonitis, etc.). His results agree well with those of Mills. He found that the proportion of cases showing injury to spermatogenesis increased with the duration of the illness, 18 per cent. showing lesions in the first week, and 100 per cent. in the fourth to seventh weeks. The severity of the lesions also increased with the duration of the disease.

The findings in the male cases in our series, in addition to the two which have already been described, are as follows: Case 3, patient aged forty-two, dying of cerebral hæmorrhage and chronic interstitial nephritis, showed active spermatogenesis. There was thickening of the hyaline membrane and of the arteries. This was a much-deteriorated patient, who had been in the hospital twenty-one years.

A case of the paranoid form (case 4) in a man of thirty-five, dying from septicæmia and acute vegetative endocarditis, presented active spermatogenesis. There were numerous hyaline tubules, but no thickening of connective tissue. The duration of the mental disease had been at least seven years.

A man dying at twenty-two from sepsis (case 5), with a history of mental disease of four and a half years' duration, showed atrophy of the seminal epithelium with scanty spermatogenesis. The patient had extensive cellulitis of the leg, also bedsores and septic pneumonia, and was extremely emaciated at the time of death.

A katatonic of twenty-eight (case 6), dying of miliary tuberculosis, showed extreme atrophy of the tubular epithelium and thickening of the hyaline membrane, connective tissue and vessels. Interstitial cells were present in good numbers. The conditions are in contrast to the control

specimen, in which spermatogenesis was active and the connective tissue was not increased. This would seem to be a clear-cut contrast and in line with Mott's theory, except for the fact that the dementia præcox patient had been in a katatonic stupor for three years, in bed and tubed most of the time, and was much emaciated at the time of death, while the control patient was fairly well nourished.

In cases 7 and 8, the patients, aged thirty-five and forty-four, died of pulmonary tuberculosis. There was in the testicles of both cases an absence of spermatogenesis, atrophy of the germinal epithelium, and beginning fibrosis. The control specimen, however, presented even more marked atrophy than the dementia præcox cases. It is well known that tuberculosis can cause a fibrosis of the ductless glands, even when they are not directly affected by the disease. This is true not only for the gonads, but also for the hypophysis, thyroid and adrenal, as is emphasized by the findings in these endocrines in the present series. Cordes⁸ as long ago as 1898 pointed out these changes in the testicles of tuberculous patients.

In one case (case 9) the testicles were undescended, and, as would be expected, were inactive and sclerotic. Moderate numbers of interstitial cells were present.

In three patients the dementia præcox was said to have developed on a basis of feeble-mindedness. The conditions in the gonads of the first case (case 10) were quite striking. The patient was a seventeen-year-old coloured boy, having a mental age of nine and a half. He was well developed and well nourished and showed no obvious signs of endocrine anomaly. He was effeminate in manner, timid and emotional, and inclined to homosexuality. He died of chronic nephritis. The testicles are noted as being small and not threading. Microscopically, the tubular epithelium is poorly differentiated; in some places there are small numbers of spermatocytes, in others only sustentacular cells are present. The hyaline membrane is thickened, and the connective tissue is much increased and is oedematous. The arteries are thickened. There is a mild focal lymphocytic infiltration. Interstitial cells are very numerous. The condition seems to be one of non-development with superimposed chronic inflammatory changes. The control specimen showed a good development of the seminal epithelium, a few spermatozoa, and an absence of fibrous and inflammatory changes.

The second case (case 11) was a young man of eighteen, who died of lobar pneumonia. He was well developed and showed no abnormalities of endocrine origin. There was active spermatogenesis, and motility of the spermatozoa was demonstrated ten hours post-mortem. There was some thickening of connective tissue, and one area of chronic inflammation with lymphocytes, increase of connective tissue and atrophy of tubular epithelium.

The third case was a much-deteriorated patient of forty-three, who had an organic disease of the cord, diagnosed as amyotrophic lateral sclerosis. He died of lobar pneumonia. There was almost no spermatogenesis, some atrophy of the tubular epithelium, and a considerable increase of connective tissue. Interstitial cells were abundant. The control showed moderate spermatogenesis and no increase of connective tissue or interstitial cells.

It is, of course, well recognized that many of the feeble-minded give evidence of endocrine abnormalities. These have been reported clinically, and some descriptions of the gross anatomy of the various glands have been given, but there seems to have been no work done on the histology of the endocrines in a series of mental defectives. It is a subject that would undoubtedly repay study, especially if made in connection with the clinical histories and physical findings.

In regard to the numbers of interstitial cells in this series of cases, it is difficult to make any definite statement. They were abundant in some sections, and in others present in only moderate numbers. It is hard to say whether they are increased unless they are very obviously so, forming large collections between the tubules. This was the case in the feeble-minded coloured boy described above. The numbers of interstitial cells vary not only at different periods of life, but also with the condition of the tubules. Atrophy of the germinal epithelium from any cause is usually accompanied by proliferation of the interstitial cells. It is claimed that they hypertrophy at the beginning of acute infections, and that later they atrophy. As has been said, they increase in inanition. Taking everything into consideration, therefore, it would be extremely hypothetical to ascribe any variations which might be found to the dementia præcox process *per se*.

Mott states that in his cases the degree of atrophy of the sex glands was in proportion to the duration of the mental disease and the degree of psychic deterioration. We have analyzed our own data from this standpoint, with negative results. As stated above, the testicles were active in the much-deteriorated patient who had the longest known duration of the disease in the entire series (twenty-one years), and inactive in the youngest member of the group, the seventeen-year-old boy, whose disease had been evident only a few months. The condition of the glands seems to depend on the nature of the terminal disease, the state of nutrition, and possibly in some instances on whether there is an underlying defect in development which is expressed in feeble-mindedness, rather than on the duration of the mental disease.

b. The Ovaries.—The function of the ovary is extremely complex, and many points concerning it are still in dispute. The considerations which are of immediate importance in the present study are, in barest outline, first, the question of secretion. It is generally recog-

nized that the thecal cells produce a secretion. This is present before puberty as well as during the reproductive life, and there is evidence that it presides over the development of the secondary sexual characteristics. The corpus luteum also produces a secretion which inhibits ovulation, and is responsible for the cyclic changes in the endometrium, the object of which is the embedding of the fertilized ovum. Degeneration of the corpus luteum brings about menstruation, or if the individual is pregnant, abortion.

The second question having a special bearing on both the methods and conclusions of the present investigation is: What are the histological criteria of the functional state of the ovary, and also is it possible with ordinary histological methods to make any statements as to whether the number of ova in any given gland is normal or reduced? It may be said without further discussion that the presence of developing follicles and of corpora lutea, and a non-atrophic genital tract, are sure signs that the ovary is working, and, so far as one can say, normally.

The other point is more difficult. Counting primordial follicles in dementia præcox and control cases would be indecisive unless serial sections were studied. Quantitative analyses of normal ovaries have been made by the serial section method as contributions to normal histology, but for a number of cases such as ours it would be an impossible task. Little can be inferred from examination of a few sections as to the actual or comparative numbers of primordial follicles in the ovaries because their distribution is irregular, some sections containing few, and others from the same case many. It is not known whether they are more abundant in one part of the ovary than in another. The controls to cases 17 and 18 illustrate the great differences in the number of ova seen in sections of normal ovaries. Both patients were young women of normal mental and physical development and active sex life. They were both married, and the first had had one pregnancy, the second patient two pregnancies. Primordial follicles were very numerous in the second case, while in the first they were fewer in number than in some of the dementia præcox patients. This simply demonstrates how fallacious any conclusions as to an abnormal diminution of primordial follicles in the ovaries of dementia præcox patients might be unless they were based on serial sections.

Forster⁹ studied the ovaries in 100 cases of mental disease, including dementia præcox, epilepsy, mental defect, etc. According to the description of the method, which is not very clear, the ovaries were embedded in serial blocks in eeloidin, and when the follicles were scanty, serial sections were cut. In other cases, a series was cut only from one block. The author counted the largest number of follicles present at any one level throughout the sections examined. According to the table, there was great variation in the number of ova seen in all the types of

cases, and in some of the control cases there were very few follicles, fewer, in fact, than in the majority of the dementia præcox cases. She concludes, however, that the ovaries of all dementia præcox women who had reached the age of thirty showed signs of early involution, and that even below that age there was a distinct diminution of follicles compared with a normal woman of the same age. The terminal diseases in these cases are not stated. Leaving aside the adequacy of the method, the conclusions do not seem to be borne out by the actual findings.

Mott stresses the degenerative processes found in the follicles in dementia præcox patients. Follicular atresia is, however, a normal process, beginning at or even before birth and continuing until the menopause, causing the destruction of tens of thousands of ova. Out of the enormous numbers of follicles present at birth, only 400 to 600 ever reach maturity. Follicular atresia may, of course, become pathological if it is carried to excess and is combined with other abnormal conditions, as in the 'interstitial oöphoritis' of former gynæcological fame, but this does not come especially into consideration in dementia præcox. There seems, moreover, to be some evidence that excessive atresia is associated with menorrhagia, not with amenorrhœa. The latter would, of course, be more in accord with a premature atrophy of the ovary, such as has been assumed in dementia præcox.

The result of these considerations is that we may conclude from histological data that the ovary is active, but that we cannot say much about the absolute number of follicles present, nor whether there is an abnormal diminution in their number or an excessive atresia.

The third consideration for our purpose is that the ovary is extraordinarily sensitive to various influences. Histological proof of this is less easy to bring than in the case of the testicle, but clinically it is evidenced by the frequency of disorders of menstruation from a wide variety of causes. An illustration on a large scale of the effect of under-nourishment on the ovary was the war amenorrhœa among the women of the Central Powers. Loeb's¹⁰ experiments on guinea pigs show that in conditions of pronounced under-nourishment the follicles cease to develop and begin to retrogress before they have reached medium or large size. The ovary is also affected in infectious diseases, and even by psychic disturbances, perhaps through the medium of the other ductless glands.

Turning to the actual conditions found in our female cases, nine of the fifteen, including the two cases of sudden death, showed corpora lutea and developing follicles. The ages of these patients ranged from twenty-three to forty-three years. The terminal diseases were chronic interstitial nephritis, acute parenchymatous nephritis, bronchopneumonia, septicæmia, influenza, and pulmonary tuberculosis. Examples of these cases are given below.

A paranoid dementia præcox patient (case 15), of at least six years' duration, dying at forty-three from chronic interstitial nephritis, had an active ovary, quite as active, in fact, as the control.

Similarly, the ovaries of case 16, dying at thirty-five from acute parenchymatous nephritis, did not differ essentially from the control. Both contained corpora lutea and numerous primordial follicles.

A woman dying at twenty-four from septicæmia (case 17) showed several corpora lutea and maturing follicles. The control case had equally active ovaries.

A patient with mitral stenosis (case 18), aged thirty-three, in whom the immediate cause of death was influenza, showed a corpus hæmorrhagicum, some recent corpora lutea, and some small follicular cysts. Ova were scarce, and the arteries were much thickened. A control influenza case also had an active ovary, although only a few primordial follicles were seen. A control case of mitral stenosis showed a recent corpus fibrosum, one developing follicle, and rather small numbers of ova.

Five of the six patients whose ovaries contained neither developing follicles nor corpora lutea died of pulmonary tuberculosis. Two were over forty. The atrophic state of the ovaries is not surprising in view of the effect of the tuberculous process on spermatogenesis. In fact, the conditions are analogous.

Two of the women in this last group presented signs of infantilism, both in general make-up and in the genital tract. The first patient (case 26) died of mitral stenosis, at the age of thirty-three. She was under-sized and undeveloped, and the secondary sexual characteristics were poorly differentiated. The breasts were undeveloped, and the external genitalia infantile. Menstruation had begun at fourteen, and had been irregular and painful. The uterus was small and retroflexed. The ovaries contained several corpora fibrosa, very few primordial follicles, and no developing follicles or corpora lutea. The control specimen showed more primordial follicles, although they were not numerous, a developing follicle, and a recent corpus fibrosum.

The other case (case 27) was a woman of twenty-three, in whom the dementia præcox had developed on a basis of feeble-mindedness. Her appearance was immature; the breasts were undeveloped, and the body hair scant. Menstruation had begun at twelve and had been regular, at least before the patient entered the hospital. The ovaries were large and flat. Primordial follicles were rather scarce, and there was an excess of connective tissue in the cortex. Numerous corpora fibrosa were present, and two small follicular cysts, but no developing follicles or corpora lutea. The uterus was small and fibrous.

The frequency of genital infantilism or of some of the manifestations of the hypoplastic constitution in dementia præcox patients has impressed a number of observers. Gibbs¹¹ has very recently studied

the sex development and behaviour of a series of dementia praecox patients, and has noted the frequent absence of "the finishing touches of physical maturity." The presence of a genital infantilism may account for some of the anatomical reports of inactive and fibrous gonads in dementia praecox patients. Nevertheless, this idea should not be generalized too widely, for according to our experience inactivity of the sex glands is far from being the rule in this disease, and when it is present there are usually more immediate causes to account for it.

II. THE HYPOPHYSIS.

A special importance attaches to the examination of the hypophysis in dementia praecox, as its inter-relation with the gonads is closer than with any of the other endoerines. It influences both the development and the function of the sex glands. If a condition of hypopituitarism comes on before puberty, there is a tendency to the persistence of sexual infantilism: while if it occurs after puberty, there is likely to be atrophy of the gonads and some loss of secondary sexual characteristics.

The hypophysis was available in twenty-one of the twenty-seven cases in this series, nine men and twelve women. There were no signs of hypopituitarism recorded in the physical examinations or autopsies.

The finer histology of the hypophysis in normal conditions is still undetermined, and very little is known of the reaction of the gland to abnormal influences, such as infections. The mutual relationships of the different types of cells are still unsettled. Some investigators believe that the three types, the chromophobes and the two varieties of chromophils (eosinophils and basophils), represent different functional states of one kind of cell. Others consider that the chromophobe is the primary cell and that the acidophils and basophils develop from it in two divergent directions, with perhaps two specific secretions.

The arrangement and numbers of the different kinds of cells vary considerably in different parts of the anterior lobe, so that it is impossible to make any reliable statements as to the predominance of any cell type unless a number of sections are cut from different areas. The exceptions to this are pregnancy and conditions of supposed hyperplasia, in which there is an easily recognizable overgrowth of large chromophobe cells. Doubtless, changes in the relative numbers of the different cells do occur in various conditions, but these finer variations cannot be recognized with any certainty from one or even from several sections of the same gland. No work has been done to determine the general amount of variation in the cell picture among sections from different parts of the anterior lobe. Until some approximate standards have been established on this point it is impossible to say how much can be inferred as to predominance of cell types from examination of a single section. Cushing¹² speaks of the variations in the pars anterior as being so kaleido-

scopic that there seems to be no fixed adult type of 'normal' gland; but apparently a considerable number of generalizations in the literature as to the effects of various conditions on the cell type in the anterior lobe have been made on the basis of comparatively few sections.

For the reason given above we are unable to say anything definite as to the cell picture in the anterior lobe in our dementia præcox cases. A better knowledge of the changes which occur under the influence of various physiological and pathological states is necessary before we can interpret the pictures found in dementia præcox. As a matter of fact, there are considerable differences in the relative proportions of the cell types in sections of the anterior lobes, but they cannot be correlated with any other conditions present.

There are certain other findings, however, which are of interest. In several glands the pars anterior cells were small and closely packed, the nuclei dark staining, and the cell granules inconspicuous, the general picture being one of inactivity. This was accompanied by a mild thickening of the stroma. All the glands showing this condition came from cases of pulmonary tuberculosis, but not all the tuberculous cases showed it. The sex glands were inactive in most of these cases.

Nine of the twenty-one glands showed a degree of fibrosis ranging from moderate to marked. This appeared as a general thickening of the framework, as scattered foci of connective tissue in the interior of the gland, as ingrowths from the capsule, and quite frequently as a radiation from the region of the pars intermedia. There is normally a spot of connective tissue in the centre of the anterior lobe, and some slight spreading of connective tissue into the anterior lobe from the pars intermedia is found so frequently that it can scarcely be called abnormal. These pituitaries showing overgrowth of connective tissue were found in several of the cases of tuberculosis, two cases of chronic nephritis, two cases developing on a basis of feeble-mindedness (one the boy of seventeen referred to above), and the case of sudden death from œdema of the glottis. In all except one of the male cases there was a coincident fibrosis of the testicle. It was more difficult to judge of a similar change in the ovary. Evidently, therefore, the fibrosis found in the testicle in some cases of dementia præcox is not an isolated phenomenon, as a similar condition affects also the hypophysis.

In regard to the functional state of the sex glands in the cases in which the pituitary was examined, five of the nine cases with fibrosis in the pituitary had inactive sex glands (male three, female two), two showed slight activity (male), and two were active (female). Of the twelve cases showing no fibrosis, nine had active sex glands (three males, six females), and two inactive (males). The case of undescended testicles also had no fibrosis in the pituitary. In other words, in cases in which there was some fibrosis in the pituitary, the sex glands were

inactive or only slightly active in 77 per cent. of the cases : while in those having no fibrosis in the pituitary they were active in 75 per cent. of the cases. Putting the matter in another way, of the seven inactive or slightly active testicles in the series in which the pituitary was examined, five were associated with fibrous pituitaries, and the two cases with inactive ovaries both had fibrous pituitaries. In the three cases presenting active spermatogenesis there was no fibrosis in the pituitary. Of the eight active ovaries, six were associated with no fibrosis in the hypophysis. These results show that there is a tendency for inactive gonads to be associated with some degree of fibrous increase in the pituitary.

In only one patient dying of an acute disease or by accident was there a fibrous pituitary.

In the hypophysis of the patient dying during a katatonic excitement there was intense congestion of the anterior lobe. Numerous acini were filled with a finely granular material staining faintly with eosin, apparently a secretion, which seemed to be continuous with the cytoplasm of the eosinophilic cells which lined the acini.

Several questions arise in connection with these glands. Is the fibrous increase in the pituitary at all characteristic of dementia præcox, or is it found as often in other cases ? Is it connected more closely with the state of the sex glands than with the other endocrines ? If so, is the fibrosis in both organs due to a common cause, and is this one which acts especially in dementia præcox—a primary sclerosis, as has been inferred by Mott—or does it depend rather on chronic somatic conditions ?

For control hypophyses it was necessary to use those in the collection of the pathological laboratory of the Massachusetts Department for Mental Diseases, as the gland is seldom removed at autopsies in general hospitals. There were, however, in this collection a number of cases of epidemic encephalitis and other non-psychotic conditions, a large number from middle-aged, elderly and tuberculous mental patients, other than dementia præcox, and a few from the feeble-minded. In all but one of the non-tuberculous cases under forty years there was no fibrosis in the pituitary, and the sex glands were active. These patients all died of fairly acute diseases. The one case showing increase of connective tissue in the pituitary had a similar condition in the testicle. These findings agree quite well with the results in dementia præcox patients who died of acute diseases. In the middle-aged and elderly individuals there was much variation, some having marked fibrosis, while others, even some elderly persons dying from manifestations of arteriosclerosis, showed none. All the cases of pulmonary tuberculosis had fibrosis, usually of a marked degree. It may come on in young tuberculous subjects, as an advanced fibrosis was found in a sixteen-

year-old girl. This emphasizes once again the sclerosing effect of the tuberculous process which was demonstrated in the reproductive glands. The conditions in the feeble-minded varied, some glands having no fibrosis, and others, even in young people, a marked diffuse overgrowth.

To anticipate the findings in the thyroid and adrenal, it may be said here that fibrosis in the pituitary is more closely linked with a similar process in the gonads than is the case with the other endocrines.

The evidence at hand, therefore, seems to show that fibrosis in the pituitary and the gonads has some special inter-relation, but that this is by no means peculiar to dementia præcox. It seems to depend rather on the nature and duration of the terminal disease and the state of nutrition.

III. THE THYROID.

In the thyroid the situation as to evaluating the histological picture is similar to that in the pituitary. There are considerable differences in histological appearances in various parts of the same gland. In addition to these regional differences, the range of normal histological variation has not been determined. Another difficulty is that ordinarily the whole gland is not removed at autopsy, but only a small specimen is secured from one lobe.

Pieces of the thyroid were available from fifteen cases, eight male and seven female. The considerations given above make any generalized statements as to the conditions found of limited value. Taking the sections as they stand, however, the two facts which are apparent are that pathological conditions are less frequently found in the thyroids of this series than in the gonads, and that a tendency to fibrosis is present in the thyroid as well as in the sex glands and the hypophysis. Considering how sensitive the thyroid is to a variety of conditions, one is rather surprised to find how few signs the glands in this series show of past or present strain.

Sections from seven of the thyroids contained resting colloid tissue only. In six more there were in addition some few acini showing active secretion. Three of these thirteen glands presented some focal fibrosis, which in one was progressing actively. The normal resting or slightly active thyroids came from one of the cases of sudden death, from the case dying during katatonic excitement, from a case of chronic nephritis, one of fibrinous pleuritis, and the remainder were cases of tuberculosis. It is rather interesting that the section from the patient dying in a katatonic excitement showed only very slight signs of activity. The most active specimen was from the feeble-minded coloured boy. The thyroids presenting moderate fibrosis in addition to otherwise normal colloid gland were from cases of tuberculosis, pneumonia and septicæmia.

Sections from two glands showed a moderate hyperplasia with marked focal fibrosis, combined in one instance with collections of lymphocytes. One was from a man dying at thirty-five from tuberculosis; the other from the woman of forty-three who died from asphyxia. Marine¹³ considers that an increase of connective tissue in the thyroid is explained most rationally as a part of a general thyroid reaction during active hyperplasia and its persistence after the epithelial cells have died. According to this interpretation, a fibrosis in the thyroid would signify neither an atrophic nor an inflammatory condition. In three of our cases, however, the usual sign of previous hyperplasia, i.e., a colloid goitrous condition, was absent. In some of the cases, also, with fibrous increase in the thyroid there was a similar condition in the sex glands and the hypophysis. Lymphoid tissue is normally present in the thyroid, and it increases in conditions of hyperplasia of the gland.

Reviewing the condition of the sex glands and the pituitary in the cases in which the thyroid showed fibrosis: In two there was marked fibrosis in the testicles and pituitary. In one case spermatogenesis was active, there was no fibrosis, and the pituitary had only a slight increase of connective tissue. In the two female patients the ovary was active in one, inactive in the other, and the pituitaries were not available. Again we see that the fibrosis in the gonads is not an isolated finding, but it appears also in the other endocrines. We do not wish, however, to over-emphasize the changes in the thyroids, as they were rather mild on the whole, and, as has been said, represent the conditions in only one part of the gland.

IV. THE ADRENALS.

The entire question of the physiological importance of the adrenal is at the present time under revision. From the standpoint of pathological anatomy alone, rather few lesions have been identified. The most important of these are congenital anomalies, tumours, tuberculosis, and the changes which result from acute and chronic infections and intoxications and from inanition. Very little is known of the pathology of the adrenal in relation to the other endocrines, aside from the over-function of the cortex, which is associated in children with sexual precocity, and in adult women with the development of male secondary sexual characteristics. The gland, and more especially the cortex, hypertrophies during pregnancy. The cortical portion is supposed to have a stimulating action on the gonads, but not on the other ductless glands.

The adrenals were examined in twenty-five of the twenty-seven cases in this series. The abnormalities found seem to be sufficiently accounted for by the diseases to which the patients succumbed, as they were such as are usually associated with those diseases, and were of the same general nature in all of a given class of cases.

In the patients dying suddenly from accident, the cortex contained a good amount of lipoid, and the glands were not remarkable in any way. These patients were well nourished and in good physical health. In the septic conditions the lipoid was greatly diminished, the cortical cells showed parenchymatous degeneration, and in one instance there were areas of necrosis in the cortex. The glands were usually markedly injected. In the tuberculous patients the lipoid was small or moderate in amount, the capsule was often thickened, and collections of lymphocytes were frequent. The cases of chronic nephritis had large amounts of lipoid. Degenerative changes and variations in the lipoid content are well recognized in these diseases.

It may be of interest to mention here that the peculiar hyaline or colloid droplets in the adrenal medulla, which are described by Mackenzie¹⁴ as occurring very commonly in influenza, were found in abundance in our one example of the disease. Their origin is unsettled. They are not confined to influenza, but are found also, though infrequently, in other acute infections.

The effects of inanition on the adrenals have been studied by Jackson¹⁵ for the rat, and by Byrne¹⁶ and Meyer¹⁷ for man. In chronic inanition in adult rats there is a variable amount of degenerative change in the cortical cells, combined with simple atrophy, and less marked changes in the medulla, with no decrease in the chromaffin reaction. The lipoid is usually decreased. Byrne noted an enlargement of the adrenals, particularly of the cortex, in autopsies on prisoners in German prison camps. This may have been the result of the quality as well as the quantity of the food, for McCarrison⁴ found that a scorbutic diet produced in guinea pigs a congestion and enlargement of the adrenals, the changes in the glands being present before symptoms appeared. Meyer, in an autopsy on a man who died after fasting for sixty-three days, found extreme disintegration of the cortical cells.

Eleven of our cases were markedly emaciated at the time of death. None were uncomplicated cases of inanition, although several had been tube-fed for considerable periods. Most of them died from tuberculosis or sepsis. The adrenals showed no special peculiarities macroscopically, and were neither markedly increased nor decreased in size. The amount of lipoid was variable, in some instances, especially in the septic cases, being greatly reduced, in others being present in moderate amounts. Foci of lymphocytes, especially in the medulla, were frequent. These were much more common in the emaciated cases, though occasionally present in other conditions. Sometimes they were coincident with collections of lymphocytes in the thyroid, but more frequently not.

The condition of the adrenals in the patient dying in a katatonic excitement is especially interesting from the viewpoint of the reaction of these glands to muscular fatigue. The patient was in the Boston

Psychopathic Hospital for four days preceding death, and was noisy and violent during the entire time. He was entirely sleepless for the first two days, and during the last two he slept only from one to three hours daily. The immediate cause of death was acute cardiac dilatation. The cells of the adrenal cortex were small and stained intensely. Staining with Schiarlach R showed that the lipoid had disappeared except in small groups of cells in the outer zone. The medulla was extremely congested. As far as could be judged from ordinary Zenker fixation, there was a fair amount of chromaffin material. Laignel-Lavastine¹⁸ reports six cases of mental disease ('mental confusion,' 'acute mania,' Huntington's chorea, and dementia præcox), dying after prolonged and intense motor agitation, in which he found complete absence of lipoid in the adrenal cortex. Mulon and Porak¹⁹ had previously noted the absence of lipoid in a case of Huntington's chorea.

CONCLUSIONS.

The gonads, pituitary, thyroid, and adrenals have been studied in twelve male and fifteen female cases of dementia præcox dying under forty-five years of age. This has been done as far as practicable in connection with control non-psychotic cases of approximately the same ages dying of the same diseases.

An effort has been made to emphasize the sensitiveness with which the ductless glands react to various influences, and consequently the complexity of the problem of interpretation of the changes which are actually found in them in dementia præcox.

In regard to the gonads, the crude results are that sixteen patients had active glands, using as criteria the presence of spermatogenesis and of maturing follicles and corpora lutea. The patients dying of accident or of acute diseases had active glands, with the exception of one case, in which there was only slight spermatogenesis. In tuberculous cases the gonads were atrophic, and the testicles showed fibrosis. The patients who were emaciated at the time of death also had inactive glands. In two of the patients in whom the dementia præcox developed on a basis of feeble-mindedness the testicles showed abnormalities. Two of the women (one originally feeble-minded) presented signs of a genital infantilism. Further study of the endocrines in the last two groups of dementia præcox patients, i.e., of the mentally inferior and of those who show stigmata of the hypoplastic constitution, is indicated.

When the tuberculous cases, those developing on a feeble-minded or hypoplastic basis, and those dying of wasting diseases are subtracted, the remainder have active gonads.

There was no correlation between atrophy of the sex glands and the duration of the mental disease or the degree of psychic deterioration.

The conditions in the sex glands of the controls were essentially the

same as in the dementia præcox cases for the same terminal diseases, with the exceptions of the feeble-minded, the infantile and the emaciated cases.

The pituitaries in a little less than half of the cases presented a fibrosis, which could be correlated to some extent with a similar condition in the gonads. As demonstrated by controls, this fibrosis in the pituitary is not peculiar to dementia præcox, but depends rather on the nature and duration of the terminal disease and the state of nutrition.

The lesions in the adrenals were such as are usually found in the diseases to which the patients succumbed.

The thyroids showed changes less frequently than the other endocrines. There was occasionally a mild glandular hyperplasia or increase of connective tissue.

The influence of tuberculosis in producing a fibrous increase in the ductless glands, particularly the gonads and pituitary, has been emphasized once more by the study of this series.

From the pathological side there is very little evidence of a primary atrophy of the gonads in dementia præcox, with the possible exception of those cases developing on a basis of mental defect. The fibrosis which is sometimes found in the sex glands is not an isolated change, but is frequently present also in the hypophysis and occasionally in the thyroid. The atrophy, when present, can be accounted for by the somatic diseases from which the patients suffered. This explanation is not only simpler and less hypothetical than that of a primary atrophy, but it is more in accord with the facts if they are critically studied. It agrees also with recent experimental and pathological work on the ductless glands, particularly the gonads.

The condition of the endocrines in dementia præcox requires far more study, both clinical and anatomical, but sufficient work has already been done to demonstrate that the actual state of the glands is very variable. There is no one uniform condition of the gonads or other endocrines in dementia præcox, dependent on the disease process. The main factors which determine the condition of the glands at autopsy are the nature and duration of the terminal disease, the state of the nutrition, and possibly in some instances an underlying defect of development which is expressed in feeble-mindedness or the hypoplastic constitution.

SUMMARIES OF CASES.

1. M. 31. Seclusive make-up. Good student; high school graduate. Economically inefficient. The onset of the disease was with somatic ideas and a religious trend. Emotional reaction shallow. Physical examination not remarkable. Fairly well nourished. The patient passed into an excited

inaccessible state. Death from œdema of the glottis. Known duration of the disease, about one year.

Testicles.—Scanty spermatogenesis. No increase in connective tissue. Interstitial cells present in moderate numbers.

Pituitary.—Considerable diffuse fibrosis in the anterior lobe.

2. M. 35. Jewish. Quiet, industrious, thrifty. Twice married. First wife ran away. Three children. There is an indefinite history of an illness for two months, which prevented patient from working. This was followed by a sudden outbreak of excitement. His dead father was choking him and his brother trying to shoot him. Violent excitement of seven days' duration. Death from acute cardiac dilatation. Well-nourished man.

Testicles.—Very active spermatogenesis. Abundant interstitial cells. Focal increases of connective tissue.

Pituitary.—Intense congestion. Large masses of granular eosinophilic material (secretion?) in anterior lobe. No fibrosis.

Thyroid.—Mostly resting colloid gland; occasional signs of activity.

Adrenals.—Practically no lipid. Intense congestion of the medulla.

3. M. 42. Hospital residence of twenty-one years, during the first part of which he was hallucinated, noisy, impulsive, and inaccessible. Later he became extremely deteriorated, apathetic, unoccupied, and untidy. Death from cerebral hemorrhage and chronic interstitial nephritis.

Testicles.—Active spermatogenesis. Thickening of hyaline membrane and arteries. No increase in connective tissue. Interstitial cells scarce.

Thyroid.—Mostly resting colloid; a few active follicles.

Adrenals.—A large amount of lipid.

4. M. 35. A long history of auditory hallucinations and ideas of persecution, to which the patient reacted with violence. Poor judgment and no insight. He had been in mental hospitals both in England and in the United States. Well developed and well nourished. Died from septicæmia.

Testicles.—Active spermatogenesis. Abundant interstitial cells. Numerous hyaline tubules. No increase of connective tissue.

Pituitary.—Slight thickening of stroma.

Thyroid.—Mostly normal resting gland. A few foci of young connective tissue overgrowth, associated with collections of lymphocytes.

Adrenals.—Areas of necrosis in cortex. Foci of lymphocytes.

5. M. 22. Jewish. Egoistic, seclusive, precocious. College graduate. The patient had not been normal since eighteen years of age, when he was disappointed in obtaining a teaching position. He became 'nervous' and depressed and developed ideas of reference. Had done no work since his breakdown. In the hospital six months, during which time he was excited and inaccessible, probably hallucinated. His productions were incoherent. He showed mannerisms and was untidy. Died of sepsis. Extremely emaciated at the time of death.

Testicles.—Tubular epithelium thin and spermatogenesis scanty. Interstitial cells numerous. No increase in connective tissue.

Adrenals.—Cloudy swelling of cortical cells. Marked injection. Collections of lymphocytes.

6. M. 28. Seclusive make-up. At twenty-one he became infatuated with a girl. He soon became depressed, had disturbing dreams, and developed ideas of reference. In the hospital he was resistive, mute and untidy. He was in a katatonic stupor during the last three years of life. Much emaciated. Death from miliary tuberculosis.

Testicles.—Extreme atrophy of seminal epithelium. Thickening of hyaline membrane and vessels. Increase of connective tissue and slight lymphocytic infiltration. Interstitial cells numerous.

Pituitary.—Marked fibrosis in anterior lobe.

Thyroid.—Normal resting colloid gland.

Adrenals.—Moderate amount of lipoid.

Control.—M. 26. Died of miliary tuberculosis. Fairly well nourished.

Testicles.—Active spermatogenesis. No fibrosis. Interstitial cells present in moderate numbers.

7. M. 35. Duration of psychosis thirteen years. Died of pulmonary tuberculosis.

Testicles.—Moderate atrophy of seminal epithelium. A few spermatozoa present. Interstitial cells abundant. Moderate fibrosis.

Pituitary.—Considerable fibrosis.

Thyroid.—Slight hyperplasia of gland tissue. Collections of lymphocytes. Marked focal fibrosis.

Adrenals.—Moderate amount of lipoid. Thickening of capsule.

Control.—M. 31. Died of pulmonary tuberculosis.

Testicles.—More atrophy of tubular epithelium than in dementia praecox case. No spermatozoa. No fibrosis. Interstitial cells scarce.

8. M. 44. Married and had one child. He had been in different State hospitals for over fourteen years. Early in his hospital residence he had very active auditory and visual hallucinations and fragmentary delusions, especially of influence. There was progressive dementia, and at the time of death he was much deteriorated. Died of pulmonary tuberculosis.

Testicles.—Resemble those of case 7.

9. M. 39. Hospital residence of eighteen years, in the earlier stages of which the patient showed excitement, impulsive reactions, hallucinations, and expansive delusions. There was progressive deterioration, and for several years before death he was extremely demented. He was fairly well developed and nourished. Beard scanty. Distribution of hair on trunk and extremities abnormal. Genitalia poorly developed. Death from fibrinous pleuritis and hydrothorax, following a fractured rib.

Testicles.—In inguinal canal. Tubular epithelium undifferentiated. Moderate numbers of interstitial cells. Much fibrosis. Arteries hyaline.

Pituitary.—No fibrosis.

Thyroid.—Resting colloid gland.

10. M. 17. Mulatto. Mental age nine and a half. Intelligence quotient 57. The patient had been kept at home and had never worked. He had probably had homosexual experiences, but denied heterosexual relations. He was timid, effeminate and emotional. He had an outbreak of excitement and violence, probably in reaction to auditory hallucinations.

Later he became mute, at times destructive, and showed katatonic rigidity. Well nourished. No anomalies of development recorded. Cause of death, chronic nephritis. Duration of mental disease, eight months.

Testicles.—Tubular epithelium poorly differentiated. Hyaline membrane thickened and wavy. Connective tissue increased and œdematous, with mild lymphocytic infiltration. Arteries thickened. Interstitial cells abundant.

Pituitary.—Moderate fibrosis in the anterior lobe.

Thyroid.—A considerable number of active acini.

Adrenals.—A moderate amount of lipid.

Control.—M. 16. Died of chronic nephritis.

Testicles.—Complete differentiation of seminal epithelium and a few spermatozoa in numerous tubules. No fibrosis. Interstitial cells present in moderate numbers.

11. M. 18. The patient had been in a school for the feeble-minded. At twelve years he graded at eight and a half. He had shown progressive deterioration since his sixteenth year, becoming noisy, irritable and hyper-religious, and developing auditory hallucinations and somatic ideas. Well developed and well nourished. Developing beard. Genitalia normal. Cause of death, lobar pneumonia.

Testicles.—Active spermatogenesis. Interstitial cells rather scarce. Slight increase of connective tissue and one focus of chronic inflammation with atrophy of tubules.

Pituitary.—Slight increase of stroma in the anterior lobe.

Adrenals.—Not remarkable.

12. M. 43. Originally defective. He had signs of amyotrophic lateral sclerosis. He was in the hospital eight years, and during that time deteriorated markedly. He was actively hallucinated. No endocrine anomalies of development. Death from lobar pneumonia.

Testicles.—Small. Spermatocytes present; no spermatozoa. Interstitial cells abundant. Considerable fibrosis.

Pituitary.—Marked diffuse fibrosis in anterior lobe.

Thyroid.—Resting colloid gland with slight increase in stroma.

Adrenals.—Much lipid.

Control.—M. 43. Non-alcoholic. Died of lobar pneumonia.

Testicles.—Moderately active spermatogenesis. Interstitial cells abundant. No increase in connective tissue.

13. F. 43. The patient had been in the hospital for seven years, and during the entire time was mute to the physicians, and had been known to speak to the nurse only very rarely, saying a few words each time. She was indifferent to her surroundings and was usually cared for in bed. Fairly well nourished. Suicide by hanging.

Ovaries.—Large. Corpus hæmorrhagicum; receding corpus luteum. Maturing follicles. Primordial follicles scarce.

Pituitary.—No fibrosis.

Thyroid.—Mostly resting colloid gland; some areas of slight hyperplasia.

Adrenals.—Much lipid.

14. F. 43. At twenty she had 'nervous prostration.' She was

married at twenty-one and had two children. She was in the hospital eighteen months, and during that time was mute, restless and indifferent. She had delusions about water, and also showed stereotypies. Death from asphyxia, due to aspiration of vomitus.

Ovaries.—A fresh corpus luteum present. Few ova seen.

Pituitary.—No fibrosis.

Thyroid.—Considerable hyperplasia. Collections of lymphocytes. Much fibrosis.

Adrenals.—A large amount of lipoid.

15. F. 43. Always quiet, seclusive and exceptionally neat. She lived alone, moving frequently because she thought a man was following her. She had auditory and visual hallucinations. Known duration of mental disease, six years. Death from chronic interstitial nephritis.

Ovaries.—A corpus hemorrhagicum present, also a corpus fibrosum in an early stage. No primordial follicles in section.

Pituitary.—A general thickening of the stroma in the anterior lobe.

Adrenals.—Much lipoid.

Control.—F. 43. Died of chronic interstitial nephritis and cerebellar hemorrhage.

Ovary.—A fresh corpus luteum present. No primordial follicles seen.

16. F. 35. Cause of death, acute parenchymatous nephritis.

Ovaries.—A young corpus luteum present. A few maturing follicles. Numerous primordial follicles.

Pituitary.—No fibrosis.

Adrenals.—Lipoid small in amount.

Control.—F. 27. Died of acute nephritis.

Ovaries.—A corpus luteum present, also numerous maturing and primordial follicles. Corpora fibrosa in various stages.

17. F. 24. Quiet, conscientious and a good worker. An acute onset of the disease seven weeks before death with somatic complaints, fatigue, fear and auditory hallucinations. In the hospital the patient was confused, disoriented, resistive, and hyperactive. Death from staphylococcus aureus septicæmia.

Ovary.—A corpus hemorrhagicum and several corpora lutea in different stages. A number of maturing follicles.

Pituitary.—No fibrosis.

Adrenals.—Parenchymatous degeneration of cortical cells. Practically no lipoid. Congestion.

Control.—F. 28. One child. Therapeutic abortion one month before death on account of chorea. Death from staphylococcus aureus septicæmia. The primary focus was in the aurum, from which the patient had had symptoms for some time before the abortion.

Ovaries.—A receding corpus luteum of pregnancy. Numerous corpora fibrosa in various stages. Three sections contain only a few primordial follicles.

18. F. 33. Always peculiar, high-tempered, stubborn, and seclusive. She was married at twenty-one and had one child. There was a gradual

character change, beginning at twenty-seven years. In the hospital she denied her relatives, gave a fictitious account of her life, called the hospital doctors her father and brothers, and imagined herself pregnant. She had mitral stenosis. Death from influenzal bronchopneumonia.

Ovaries.—Contain a corpus luteum and several recent corpora fibrosa. Moderate numbers of primordial follicles in section. Much arterial thickening.

Adrenals.—A good amount of lipoid present. Hyaline bodies abundant in the medulla. A few lymphocytes.

Control.—F. 28. Died from influenzal pneumonia four weeks after a normal childbirth.

Ovaries.—A receding corpus luteum of pregnancy. Numerous corpora fibrosa in various stages. Primordial follicles very numerous. Some developing follicles. See also control to case 26.

19. F. 31. She was married at twenty-four and had two children. Duration of the psychosis at least six and a half years. Hospital residence of four years, during which the patient showed progressive deterioration. Death from pulmonary tuberculosis.

Ovaries.—One developing follicle. Moderate numbers of primordial follicles in section. Some atretic follicles. Recent corpus fibrosum. Increase of connective tissue in cortex.

Pituitary.—The cells of the anterior lobe are small, closely set, and their granules inconspicuous. Mild diffuse fibrosis.

Thyroid.—Resting colloid gland.

20. F. 31. Coloured. During the first part of her hospital stay of fifteen months she had auditory hallucinations, and was suspicious and inaccessible. She later became violent, resistive, aggressive, and untidy. Cause of death, pulmonary tuberculosis.

Ovaries.—A few primordial follicles in section. No maturing follicles. Cortex fibrous.

Pituitary.—Considerable fibrosis in the anterior lobe.

Adrenals.—An increase of connective tissue in the cortex and medulla. Congestion. Collections of lymphocytes.

21. F. 36. Death from pulmonary tuberculosis.

Ovaries.—A corpus luteum present. A few maturing follicles and many atretic follicles. Small numbers of ova.

Pituitary.—Slight focal increases of connective tissue.

Adrenals.—Very little lipoid.

22. F. 43. Always 'nervous.' She was married at thirty and had two children. The onset of the disease was at thirty-five, when she thought people were trying to shoot her, became excited and noisy, and wandered away from home. In the hospital she gave evidence at first of auditory hallucinations and ideas of persecution, but soon became mute, resistive, inaccessible and slovenly, with peculiar mannerisms. Death from pulmonary tuberculosis.

Ovaries.—Appear large, due to increase of connective tissue in the cortex. Very few primordial follicles. Some atretic follicles. No corpora lutea. Vessels much thickened.

Pituitary.—Marked focal fibrosis in the anterior lobe.

Thyroid.—A tendency to the colloid goitre type of gland (no gross enlargement). No signs of activity.

Adrenals.—Lipoid scanty. Thickening of capsule. A few lymphocytes.

23. F. 33. Portuguese. The patient was married, and had had two children and several miscarriages. The second child was born three years before the patient's death, while she was in the hospital. She was committed at twenty-nine years on account of auditory hallucinations, and ideas of reference, jealousy and poisoning, which gave rise to homicidal and suicidal attempts. She had a period of katatonic stupor of two months' duration following her last confinement. Death from pulmonary tuberculosis.

Ovaries.—No corpora lutea present. Numerous corpora fibrosa. Moderate numbers of ova and one developing follicle.

Thyroid.—Inactive. Considerable fibrosis in one section.

Adrenals.—A small amount of lipoid. A few lymphocytes.

24. F. 41. The patient was married and had one child. At thirty-four years she had an outbreak of excitement and violence, with auditory hallucinations and ideas of reference and persecution. She was in the hospital seven years, during which time she steadily deteriorated. She died of pulmonary tuberculosis.

Ovaries.—No corpora lutea or primordial follicles. Several atretic follicles.

Pituitary.—Focal fibrosis in the anterior lobe.

Thyroid.—Resting colloid gland with a few signs of activity.

Adrenals.—A good amount of lipoid. Numerous collections of lymphocytes.

25. F. 23. Polish. Past history unobtainable. She had been in two State hospitals, residing in the last one eighteen months. Here she was noisy and violent at first, probably in reaction to hallucinations. Later she was inactive, solitary and uninterested, with poor grasp on her surroundings. Poorly developed and nourished. Height, 4 ft. 8 in.; weight, 81 lb. Death from bronchopneumonia.

Ovaries.—One mature follicle present. Small numbers of ova. Atretic follicles frequent. Cortex thick and fibrous. Moderate thickening of arteries.

Pituitary.—Slight focal fibrosis in the anterior lobe.

Adrenals.—A small amount of lipoid.

26. F. 33. The patient held numerous positions only a short time, giving as the reason that "all the men fell in love with her." There was a marked change in the patient after she had influenza in 1918. She lost ambition, had "dazed" periods, and was irritable. At the hospital she admitted auditory and visual hallucinations and ideas of influence. She thought that she was threatened by a man who dominated her. She had two periods of stupor. Physical examination showed a small, poorly developed girl. Weight, 89 lb. Signs of mitral stenosis. Breasts undeveloped. External genitalia infantile. Uterus small and retroflexed. Menstruation began at fourteen; irregular, accompanied by dysmenorrhœa. Death from the cardiac condition three years after the onset of the mental disease.

Ovaries.—Large and elongated, due to the overgrowth of connective tissue. Very few ova. Some atretic follicles. No developing follicles or corpora lutea.

Adrenals.—A moderate amount of lipoid. Much congestion.

Control.—F. 36. Died of mitral stenosis.

Ovary.—Contains a recent corpus fibrosum. One developing follicle seen. More ova than in case 26, although they are not numerous.

27. F. 23. Always defective. At twenty years she began to deteriorate. She heard voices which frightened her, was unoccupied, untidy, and occasionally irritable. Menstruation at twelve; regular. Physical examination: poorly developed and nourished. Breasts undeveloped. Body hair scant. Cause of death, pulmonary tuberculosis.

Ovaries.—No corpora lutea present. Numerous corpora fibrosa. A few ova and some atretic follicles.

Pituitary.—The cells of the anterior lobe are small and closely packed, and their granules inconspicuous. Slight thickening of stroma.

Thyroid.—Chiefly resting colloid gland. Activity in a few acini.

Adrenals.—Only a small amount of lipoid. Congestion. Thickening of capsule.

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OSTEOGENETIC DURAL ENDOTHELIOMA: THE TRUE NATURE OF HEMICRANIOSIS.

BY WILDER G. PENFIELD, NEW YORK.

IN 1811 Everard Home read a paper with the title 'Cases and observations which shew that inflammation is sometimes communicated from the dura mater to the pericranium.' One of the eight cases reported came to autopsy. The only abnormal condition found in this examination was a tumour which made a projection of half an inch on the right parietal bone. On the under-surface of the bone was another similar tumour: both were 'of a fibrous bony structure. The cranium was sound between them, only unusually vascular.' An engraving from a transection of the bone bears out the description and rather strikingly resembles some of the specimens collected for this paper.

On the suggestion of Mr. Percy Sargent,* the records of the National Hospital, Queen Square, London, were searched, in the spring of 1921, for cases of brain tumour associated with cranial hyperostosis. Four hundred and twenty case-histories were reviewed, in each of which, after microscopical examination, a diagnosis of brain tumour had been made. In ten of these cases a hard lump had been described on the cranium. In each instance the neoplasm was beneath this prominence, and, unexpectedly, all of the cases presented the same histological picture. They fell into the class which is commonly called dural endothelioma. The overlying cranial enlargements proved to be, not simple hyperostoses, but part of the neoplastic process, as will be described below.

There have been isolated reports of examples of the same type of tumour as those reported here, and several cases have appeared in French literature, called hemieranioses. The true histological structure of these cranial prominences has been largely overlooked.

Brissaud and Lereboullet³ described two cases presenting a frontal enlargement limited chiefly, though not entirely, to one side of the head. It was believed, probably because of its hardness, that this cranial boss was a simple exostosis; and as the enlargement to a great extent was limited to the distribution of the upper division of one trigeminal nerve,

* I wish to take this opportunity of expressing my thanks to Mr. Sargent and to the other members of the honorary staff of the National Hospital for permission to refer to cases that have been under their care.

the condition was thought to be the counterpart of the so-called facial hemiatrophy of Romberg. The authors therefore chose to apply the name 'hemieraniosis' to the condition. Parhon and Goldstein,¹⁰ Parhon and Nadjede¹¹ and others have added cases under this name. The striking similarity to certain cases subsequently reported and to cases in this communication is evident. One may assume that, had the bone been examined, it would have been found infiltrated with neoplasm similar to that lying beneath.

Bruns,⁴ Barling and Leith,² Spiller,¹⁴ Tattersall,¹⁵ and Ashurst¹ have added similar cases with the diagnosis of endothelioma. It is

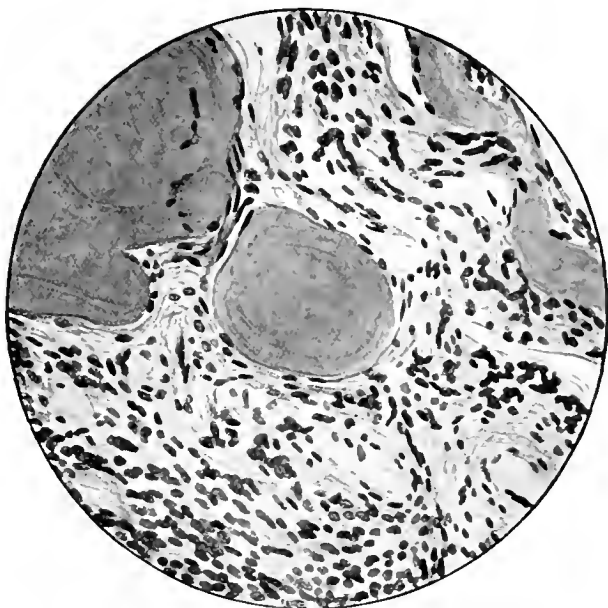


FIG. 1. Islands of bone forming in dural endothelioma.

evident that the cranial prominence in each instance is not due to a trophic change in the distribution of the trigeminal nerve. Also, the condition is frequently not unilateral. Hemieraniosis is therefore an evident misnomer.

Cushing⁷ has recently made a masterly survey of the subject of dural endothelioma, drawing conclusions from a large series of operative cases, and he described⁶ a typical example of infiltration of the overlying bone by such a tumour causing a hyperostosis. He states that of eighty endotheliomas twenty were accompanied by "an overlying hyperostosis cranii," although no statement is made as to how frequently the bone was studied with the microscope.

The term *dural endothelioma* is employed in this paper simply because

of the general usage of the term. There is no evidence that the tumours arise from endothelium; they are probably derived from the arachnoid, as suggested first by Schmidt,¹³ also by Cushing and Weed,⁵ Weed,¹⁶ and Mallory.⁹ *

The cellular appearance of the intracranial portion of these osteogenic endotheliomas, if they may be so called, is much the same as that of the ordinary subdural endothelioma. Grossly they are similar also. They are adherent to the dura and are frequently situated near the falx, most often in frontal or parietal regions, and apparently never

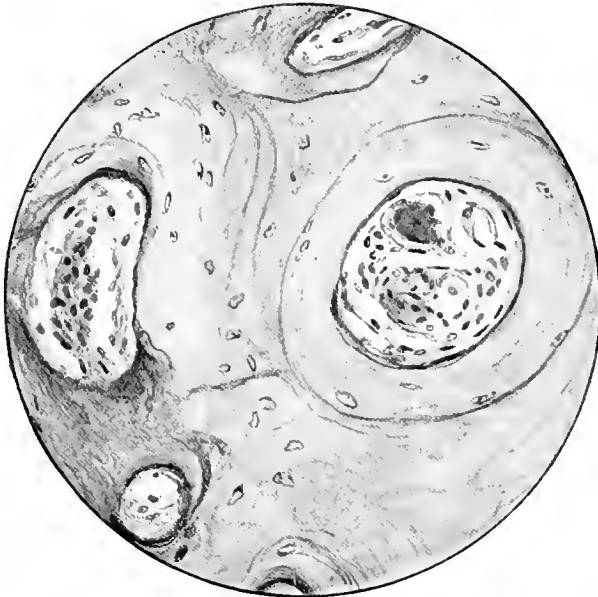


FIG. 2.—Canals of much-eburnated frontal boss filled with endothelioma cells.

below the tentorium. They are circumscribed and do not infiltrate brain tissue, but grow very slowly to a great size.

The cranial part of the growth is unique. In the cases of shorter duration the overlying bone, though hard on external palpation, appears to be more spongy than normal cranium. Endothelioma cells in strands and columns fill the cancellous spaces and Haversian canals (*Fig. 1*). In the cases of longer duration the prominence on the skull has usually been very hard and large. Tumour cells may still be found in the bony canals (*Fig. 2*), and a pad of growth is present on the summit

* Cushing has suggested the use of the term *meningioma* "as a compromise." This is a step in the right direction, but the term is so broad as to include some tumours which do not belong to the histologically clear-cut group which he has helped us to recognize under the name of dural endothelioma.

between bone and scalp (*Fig. 3*). The overlying temporal muscle and scalp are sometimes infiltrated, although the intracranial portion of the tumour may be well encapsulated. There are no metastases.

Instead of destroying the bone which lies in its path, as is usually the case with invading neoplasms, it grows into the cranium and stimulates further bone formation. As Dr. W. C. Clarke aptly expressed it, after examining some of the author's microscopical preparations, the endothelioma in its growth seems to respect the normal process of bone formation. In parts where osteogenesis is most rapid, the tumour cells are separated from new bone by quite a definite connective tissue layer



FIG. 3. Depression on the outer surface of cranial boss. Same case as Fig. 2.

(*Fig. 4*), whose structure resembles that of the septa which pass through cellular portions of the tumour (*Fig. 5*). The cells of this connective tissue layer resemble the osteoblasts seen in ordinary bone repair. They apparently are responsible for the formation and also, perhaps, for the absorption of bone. In places this layer is extremely thin. The origin of these bone-forming cells may of course be the dura whose fibres are split by the endothelioma cells (see *Fig. 5*), or the osteoblasts already present in bone may have been stimulated to increased activity.

The cases will not be reported in detail here, since this is being done in another communication.* The signs and symptoms, however, with their neurological aspects, will be briefly summarized.

* The cases in detail and their surgical aspects are to appear elsewhere.¹²

The clinical course of the following cases proved to be remarkably consistent. One patient had noticed no lump but observed that his forehead was changing its shape. The other nine patients had all noticed a cranial lump before admission. In four cases this prominence had been of ten years' standing: in four others, two to three years, and had been noticed for one year in one case. In five cases the lump was described as hard, bony, or hornlike before operation, and in the other five it was apparent, from post-operative or post-mortem examination, that the tumour must have been hard on palpation. Two of the three tumours which grew in the temporal fossa were tender on pressure, and one was



FIG. 4.—Dural endothelioma and bone separated by the characteristic layer of connective tissue cells associated with rapid bone formation. Same case as Fig. 1.

quite soft when first noticed. Only one other cranial prominence was described as tender on pressure. Five were insensitive.

The cranial enlargement was observed before the appearance of any symptoms in four cases, and in two of these there was an interval of nine years after the lump was noticed before the appearance of any symptoms. Three patients first noticed the lump about the time the first symptom appeared.

Of the nine cases with adequate clinical histories and microscopic examinations, seven patients complained of headache as their first symptom. These were not usually of the type caused by increased intracranial pressure, but were described as stabbing or neuralgic, and

may be considered referable to the dura; for, at least in four cases, the pain was referred locally to the vicinity of the lump. The following cases may serve as illustrations.

H. P. (case 1) had observed an increasing bony prominence on the left frontal region for ten years. Headache had been complained of only for one year. It was localized to the region of the prominence, and for the last six years had been stabbing in character. (*Figs. 2, 3, and 5* are from this case.)

On the other hand, C. H. (case 5) had had localized pain in the right eye for ten years before admission, while the hard swelling in the tem-



FIG. 5.—Dura, with some of its tissue apparently continuous with the tumour septa.

poral region had been of only two and a half years' duration, with proptosis of the right eye for one year.

J. T. (case 3) had observed a lump on the vertex of the skull for ten years, and for an equal length of time had suffered from epileptoid seizures, these being his first symptom. The history of this case, which is rather incomplete, does not mention headache.

E. D. (case 4) complained of unlocalized "neuralgic pains" in the head for seven years, the cranial boss being of only two years' duration.

In addition to headache the symptoms complained of depended, as one would expect, on the location and size of the intracranial tumour, and were as follows: varying degrees of hemiplegia—three cases; giddiness—three cases; epilepsy, aphasia, diplopia, and paresthesia—each

two cases; vomiting, amblyopia, mental change, drowsiness, and coma—each one case.

The usual sites of election of osteogenetic endotheliomas may be illustrated by considering those reported here with the eight cases from the literature which are susceptible of analysis. Seven were in the frontal bone, seven in the parietal bone, and four in the temporal bone. A number of them approached and partly crossed the midline. There is no record of such a tumour in the occipital or suboccipital region. The youngest patient being eighteen and the oldest sixty, the average age was thirty-nine. Twenty-nine per cent. of the patients have been female and 61 per cent. male.

If the diagnosis is made sufficiently early, before the invasion of the brain has become extensive, the prognosis in this type of brain tumour is excellent. In this series, of the nine cases with microscopical study, seven were operated upon by Sir Victor Horsley and two by Mr. Sargent. One patient, who had a very large bony tumour with little encroachment on the brain, is alive and well so far as this condition is concerned, sixteen years after operation. She shows no evidence of recurrence. One patient was perfectly well eight months after discharge, but cannot now be located. A third patient was discharged showing slight evidence of a hemiplegia, which was rapidly clearing up. One patient, an energetic clerk in a London bank, is perfectly well now, thirteen years after Sir Victor Horsley removed a tumour, which had infiltrated the right orbit and temporal muscle, and presented a subdural portion weighing 107 gm. A fifth patient is perfectly well and restored to active work as a postman, fourteen months after Mr. Sargent removed an endothelioma infiltrating scalp, skull and parietal lobe. The other four presented large intracranial growths, and died from the immediate effects of the operation, six hours, eighteen hours, twelve days and six weeks after operation.

One of the patients, a registered nurse, out of curiosity concerning a slowly growing lump on her head, consulted Sir William Gowers. She had had neuralgic headaches for several years. Sir Victor Horsley successfully removed the lump and underlying endothelioma. Thanks to their clinical insight, the true nature of the excrescence was recognized, with as yet no evidence of cerebral invasion.

A study of the case histories shows that there was a time when seven of the patients had only the bony swelling associated with local pain. The other two presented a long interval when the bony prominence and epilepsy were the only complaints. If the medical profession were better acquainted with the condition, it should be possible in a large percentage of these cases to advise operation before the onset of cerebral symptoms. The typical slow-growing bony prominence associated

with local pain, often of a stabbing character, should be considered pathognomonic of the condition.

Neoplasms of this type show no tendency to local recurrence after removal, even when scalp and muscle are invaded. They do not form a fungus when incompletely removed. It is possible that after removal of the cranial and intracranial portion of the tumour the scalp invasion does not continue to grow. There is, of course, a considerable immediate operative risk due to the great vascularity of the involved bone. Horsley's method was to cut through normal skull and rapidly remove the whole tumour *en masse*. The operative difficulties are much decreased if the diagnosis be made early.

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SOCIETY AND THE CRIMINAL

BY C. STANFORD READ, LONDON.

IN the study of human problems it seems self-evident to say that all possible scientific knowledge should be brought to bear in any endeavour to understand all the factors involved, or to find a possible solution. We are, however, so bound down by tradition and a natural intellectual conservatism that our viewpoints upon matters which have for long concerned us tend to become fixed, and we react to any stimulation to change with arguments which largely involve rationalisations and permit economy of thought. Modern psychology has especially led us to realize that in dealing with human conduct any adequate insight into the sources of motivation must be sought mainly in those realms of the mind into which awareness enters but little or not at all, and that the mental mechanisms are of such a nature that rational explanations are in essence false and dependent upon unconscious emotional tendencies. Modern psychological investigation has led us to scrutinize afresh the various maladaptations of individuals in relation to society which are connoted by the word 'crime.' Apart from those patent mental aberrations which have an intimate relationship with some criminal action, psychiatry hitherto has not regarded such a subject as falling within its purview. Psychiatrists in the future, nevertheless, will recognize that their path of interest and study must lie wherever conduct does not within certain boundaries conform to the present civilized standard. In the same way as physical disorders are viewed as a reaction to some external conditions, so in the sphere of the mind we can only take cognizance of the individual in relation to his environment. From the evolutionary standpoint so-called disease may appear at different levels, and if we look upon a psychoneurosis or a psychosis, as we should, as occurring at a 'psychological level,' we should scientifically view criminal conduct as a disorder of the still higher 'social level.' We may roughly see much analogy between the criminal and the insane in that both have specially in common an anti-social element, so that society reacts to them much in the same way. It shuts them both away if possible for its own safety, therein seeing its main duty accomplished without reflection upon the factors of the why and the wherefore, the cure or the prevention. The average member of the community knows little, if anything, of what goes on behind prison walls or within the asylum gates, nor does

he seem to interest himself much in such themes unless some special presumed inhumanity voiced through the daily press is hyperemotionally reacted to. There are many reasons why society as a whole takes small concern with the criminal and the insane, but one prominent element is that the individuals who compose such classes are difficult to understand, and it is a natural tendency to withdraw our interest from those who seem to violate the normal. It is for the same reason that the main body of the medical profession belittles and neglects the neurotic, because these seem to depend upon a pathology which is foreign to them. During late years, however, much light has been thrown upon mental mechanisms which were previously obscure, with the result that we are enabled to comprehend human conduct in its various phases in a more enlightened way, and *pari passu* our attitude towards the criminal has an enhanced interest.

First, then, we see that crime should be studied in an individual-society relationship, and that both of these factors must be taken into account. Lacassagne, the French criminologist, pointed out that every society had the criminal it deserved, that society was the culture medium in which the criminal germ could flourish. Society has only taken upon itself the retaliatory measures which in days gone by were meted out by the injured party himself or his representative, so that now the idea of private revenge, though retaining much of its emotional value, has been replaced by the abstract idea of justice in our Courts of Law. The herd evinces its hatred towards those who transgress its laws, and on reflection the prohibitions it endeavours to enforce are directed mainly against those impulses which are most instinctive in mankind. It may be truly said that we are all criminals at heart, and the difference between what society calls the good and the bad man is that the former may dream of doing what the latter actually carries into overt action. The hatred unconsciously felt by the herd is largely a defensive weapon of the individuals composing the community, in that they really identify themselves with the wrong-doer and defend themselves emotionally against those very acts which they might be tempted to do. Since we can recognize that it is the act and not the individual which is the prime psychological factor, it is plain why in our jurisdiction the crime itself, instead of the criminal, receives the main attention of the law. It is common knowledge what a venomous and unsympathetic attitude is taken up by woman-kind against a 'fallen sister,' whereas the masculine attitude is a charitable one. We see here an apt illustration of this identification mechanism. The instinctive but inhibited desire for sexual gratification, with its natural results, must in the face of herd taboo render the feminine possessor hard upon that part of her nature, and this reproach is projected upon the sufferer before her. The possible excusing factors in the case can but little, if at all, alter the emotional reaction by means

of which the self is prevented from realizing its own delinquent craving. If we keep in mind how, through identification and projection, hatred is the resulting unconscious affect of society to crime, we can understand how it is that such harsh repressive measures are meted out to its victims even before conviction. We see, too, how when the question of moral responsibility is voiced, the community projects its unconscious feelings into a fierce denunciation of those who would obstruct dire punishment, or less frequently by the same mechanism evince a grotesque sentimentality, both actions being the result of rationalisation and having no source in reason or judgment. This psychological viewpoint to some extent shows why we continue to retain a costly penal system which is supposed to have deterrence and reformation so much as its aims, when a superficial investigation demonstrates that the first factor only exists in a minor degree, while the second is practically never brought about. The unconscious retaliative spirit would explain why we have a public prosecutor but no public defender, why not even the name of an executed murderer, but only his initials, may be placed in the vicinity of the remains. That the criminal shall 'taste some of his own medicine' in cases of violence has its roots here, too. Where robbery with violence is dealt with, 'the cat,' under the guise of deterrence, is frequently administered, though such treatment patently has other motivation. The same principle applies to the carrying out of capital punishment in cases of murder, which is an extreme illustration of the *lex talionis*. We must not forget, further, the inevitable psychological effect which the continual use of the weapons of violence and revenge upon criminals has upon society itself, just as the sadistic instincts aroused in the recruited members of our late large army rendered their adaptation to peaceful civilian life difficult on discharge. Hate, too, begets hate, and there is no doubt but that our penalized criminal reads society's hatred in his treatment, and returns it with so much interest that recidivism is easily engendered. The projection of a repressed feeling of guilt upon something or some one outside ourselves, that is, the making of a scapegoat, is an inherent mechanism in all mankind, is plainly manifested in primitive customs and all religious rites and doctrines, and is demonstrated in many characteristic reactions of daily life as well as being a frequent complex in the psychoneurotic and psychotic. It represents a psychological means of attaining mental peace when some failure of an absolute repression threatens. As William White says: "In punishing the criminal mankind is not trying, primarily, to get rid of sin in the abstract; that is a rationalisation of his conduct; he is trying to get rid of that sin which he feels is resident within himself."

If, then, modern psychological studies have given us an added insight into some criminological factors, can these lead us away from mere destructive criticism to constructive efforts tending to an altered

and more rational attitude of society towards the criminal and a more scientific treatment of him? There is good reason for believing that the State would benefit much by applying psychological knowledge to this problem, so that deterrence and reformation loomed more into the foreground and the idea of revenge and punishment took a lesser place. Bernard Shaw, who shows much psychological insight in these problems, speaking in his trenchant manner of retribution on the criminal, says, "To propose to punish and reform people by the same operation is exactly as if we were to take a man suffering from pneumonia, and attempt to combine punitive and curative treatment. Arguing that a man with pneumonia is a danger to the community, and that he need not catch it if he takes proper care of his health, you resolve that he shall have a severe lesson, both to punish him for his negligence and pulmonary weakness and to deter others from following his example. You therefore strip him naked, and in that condition stand him all night in the snow. But as you admit the duty of restoring him to health if possible, and discharging him with sound lungs, you engage a doctor to superintend the punishment and administer cough lozenges, made as unpleasant to the taste as possible so as not to pamper the culprit."

Since society itself is responsible for much of the aberrational conduct of its individual members, it must look to its mental hygiene and see that the environmental conditions it engenders are of such a nature as to produce healthful reactions. As the projection mechanism involved in some abnormal personal characteristic can be analyzed out and the individual taught to see that it is within himself that the fault lies, so can society slowly but surely be educated to look upon the criminal from a different viewpoint. Punishment, though a necessary consequence of anti-social conduct, will fit the offender and not the crime, and as measures are taken to study the criminal so that the factors which led up to his maladjustments are known, he can be treated scientifically and re-educated to live in conformity with society. The social disease must be dealt with as any other form of disease would. All those repressive measures which seemingly made a passive automaton of the prisoner, but which really were building up within him a huge constellation of hostility to the world responsible for the *régime*, must be abandoned. Prison psychoses and much abnormal mental health, too, would thus be obviated. With an altered attitude on the part of the community at large, reforms would quickly advance. The law is essentially static, and it is only after a series of years that the pressure of public opinion brings legal enactments more into conformity with the constantly progressing ideas of mental science. At the present time there are indications of a movement in this direction, though for reasons we have already discussed the law is jealous of its prey, and it is with great difficulty that the legal and medical mind can see eye to eye. The intricacies of mental processes

and phenomena are at present but poorly studied even in medicine, but since some scientific knowledge of psychology is patently necessary for all those whose avocation in life leads them to deal with abnormal behaviour, it is hardly needful to point out that such a study should be part and parcel of a legal curriculum.

We may then begin to see that if society, acting through the administrators of justice, is to become effective in its control of crime, it must look further than the mere crime itself and the traditional treatment of it, to the offender himself, and see what relation between him and his environment it was which brought about the maladjustment. Scientific treatment can only follow correct diagnosis and pathology. Psychiatry here has its field, and there are already signs that advance is being made. Visitors, officially appointed, link up the prisoner with the outside world, and by human contact and good fellowship largely tend to lessen the necessity for emotional repression. The silence rule which was psychologically so harmful has also been much ameliorated in places. The interesting and valuable work of Healy and Bernard Glueck, which has borne such good fruit in America, is being initiated in our own country, and in Birmingham modern psychology and psychiatry have joined hands with the law for the good of society and the criminals within it. Society has its duties, but hitherto it has been cynically said that it has often been society which should have been tried and convicted in the dock instead of the prisoner. Through education it is to be hoped that society will be arraigned less and less on similar charges.

Short Notes and Clinical Cases.

ORGANIC NERVOUS DISEASES SUPERVENING IN THE SUBJECTS OF OLD INFANTILE PARA- LYSIS OR OLD INFANTILE HEMIPLEGIA.

BY F. PARKES WEBER, LONDON.

IN 1899, at the Clinical Society of London, I showed a boy, aged seventeen years,⁵ whose right lower extremity was completely wasted from infantile paralysis at two years of age. During the last four or five months he had complained of loss of power in the right hand, and he had found that the muscles of the right thumb were wasted. The case was perhaps an example of the supervention of chronic spinal muscular atrophy (Duchenne-Aran) in a subject of long-past infantile paralysis, but I lost sight of the patient after 1902.

By 1899 Chareot, Gowers and many others had drawn attention to the occasional occurrence of chronic anterior poliomyelitis in persons who had suffered from acute anterior poliomyelitis during childhood. In some but not in all cases the chronic wasting had been observed to start in limbs already damaged by the acute infantile disease.

In 1906, at the Clinical Society, Sir A. E. Garrod¹ showed a girl, aged eleven years, possibly an example (according to Dr. Farquhar Buzzard, in the discussion) of myopathy grafted on the infantile hemiplegia from which the patient had suffered at the age of one year. Dr. Leonard Williams had (October 22, 1903), at the Neurological Society, shown a woman, aged thirty-nine years, with infantile (congenital?) right hemiplegia and recent signs resembling paralysis agitans on the left side. In one or two cases symptoms supposed to resemble progressive primary myopathy have been observed to develop after infantile paralysis, but I do not know if these symptoms have been proved to be not due to chronic anterior poliomyelitis.

At the Paris 'Société de Neurologie,' on February 29, 1912, J. Lhermitte and Kindberg described the remarkable case of a female patient, the subject of passed infantile paralysis, who developed perforating ulcers, sacral bedsores and urinary troubles. At the necropsy, in addition to the lesions of poliomyelitis, there was hemi-atrophy of the spinal cord.

Amongst the earlier writers who referred to cases of nervous disease supervening in the subjects of passed infantile paralysis were Chareot, Ballet, Raymond, Dutil, Lachr, Langer, Strümpell and W. Hirsch. The supervening disease in most cases recorded by those writers was diagnosed as progressive muscular atrophy, mostly of the Duchenne-Aran type. The later disease did not always show itself first in the parts affected by the infantile paralysis. M. Lachr¹ described the case of a tailor, aged forty-seven years, who as a result of infantile paralysis in early childhood was the subject of permanent atrophic paralysis of the right lower extremity and paresis of the left lower extremity. Later on atrophy of the small muscles of the right hand gradually developed, perhaps due to a process of chronic anterior poliomyelitis, though the patient had urinary symptoms (which, however, may have been due to prostatic enlargement).

W. Hirsch² described (after an elaborate post-mortem examination) the case of a tailor, who at two years had had an attack of infantile paralysis, from which partial atrophy of the left upper extremity remained. At forty-two years of age progressive muscular atrophy—apparently amyotrophic lateral sclerosis—developed, terminating in the patient's death, with bulbar paralysis, at the age of forty-five years.

I will now refer to two cases which I have myself observed during recent years. The first of these two patients was a girl, D. C., admitted to hospital on September 8, 1919. She had an atrophic condition of the whole right lower extremity, together with paralytic talipes equinus on both sides, the result of an attack of infantile paralysis at the age of one and a half years. About a week before admission (at the age of fifteen years) she suddenly developed paralytic drop-wrist on the right side, and on admission there was already considerable wasting of the intrinsic muscles of the right hand. During a night, the second night after admission, she developed paralytic drop-wrist on the left side, and this was followed by wasting of the intrinsic muscles of the left hand. There was no fever or feeling of illness connected with the onset of the drop-wrist on either side. Later on, under treatment by electricity and massage, great improvement in the use of the hands took place, and the atrophy in the hand-muscles diminished. On October 28, 1919, her upper extremities had apparently recovered, and she could dress herself and use her hands like other persons. Whether the drop-wrists were due to an attack of anterior poliomyelitis or peripheral neuritis I am not quite sure.

The second case is that of a young Jewish man, aged nineteen years, born in England, admitted to hospital on January 29, 1923. In the examination of his present condition I had the great assistance of my present house-physician, Dr. G. Welsch. As a result of infantile paralysis at one and a third years of age he has a wasted right lower

extremity, but his present complaint commenced, according to his account, in December, 1917, when he suffered from a curious 'numbness' of the right side of the body, lasting fourteen days. He had a similar temporary attack on the left side in December, 1918, and in December, 1919, he had another temporary attack of the same nature on the right side. In June, 1920, he had 'numbness' all over his body and was moved about in a bath-chair at the seaside. He now has signs of disseminated sclerosis, which was first diagnosed in 1922, at another hospital, by Dr. C. Worster-Drought. He has a spastic ataxic gait, and shows slight ataxy and intention-tremor when he touches his nose with his finger. In his left (not wasted) lower extremity the knee-jerk is exaggerated, the plantar reflex is of the extensor type (Babinski's sign), and there is ankle clonus. Abdominal reflexes can still be obtained. Slight nystagmus is present, and ophthalmoscopic examination (Dr. R. Gruber) shows partial non-inflammatory, optic nerve atrophy on the right, but not the left side. By the kindness of Dr. Worster-Drought I hear that a course of treatment in 1922 by intravenous injections of 'novarsenobillon' did not lead to any improvement in the symptoms. The cerebrospinal fluid in March, 1922, was found to give a negative Wassermann reaction and a faintly positive globulin (Nonne-Appelt) reaction.

Sir William Gowers twice saw the symptoms of lateral sclerosis slowly developed in subjects of long-passed infantile paralysis. In one case the patient was seventeen years old, in the other twenty-eight. I have heard even of symptoms of syringomyelia developing in a person with old infantile paralysis. Gowers wrote²: "In the spinal cord of the subject of old infantile paralysis there seems thus to persist some disposition, slight though it be, to fresh disease, and the cases of lateral sclerosis mentioned show that the liability to disease is not limited, as has been thought, to the grey matter."

The variety of the symptoms (as judged from the preceding notes) that may supervene in the subjects of old infantile paralysis and old infantile hemiplegia certainly suggests that in some cases a special liability to disease exists (rather than persists) in the grey and the white matter of the spinal cord. But whether this liability to disease in any cases extends also to the motor nerves or their continuations—the muscles themselves—future observations must show.

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A CASE OF OCCLUSION OF THE RIGHT POSTERIOR INFERIOR CEREBELLAR ARTERY.

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CASES of occlusion of the posterior inferior cerebellar artery, if somewhat rare, are always interesting. Not a few problems connected with the localization of function in the medulla and pons are still incompletely worked out, and the peculiarly limited nature of the lesion in some cases of this condition serves to lend precision to our knowledge of the brain-stem.

The case described below came under observation some time after the acute onset of symptoms, and in this respect some of the signs often accompanying the disease have been but faintly marked: on the other hand, the relatively unchanging residuum furnishes us with an excellent opportunity of determining the symptomatology of strictly unilateral lesions of the bulb.

We wish to acknowledge our indebtedness to Dr. Kinnier Wilson for his assistance in investigating the case, which came under his notice in the Neurological Clinic at King's College Hospital on January 19, 1923, and which he gave us permission to utilize.

History of Present Illness.—The patient, a married woman of fifty-three, was known to have had valvular disease of the heart for at least five years.

In April, 1922, she suddenly and without previous warning became acutely giddy and faint one evening, felt as though the right side of her face were 'screwing up,' and immediately lost consciousness, a state which lasted for several hours. On regaining consciousness she vomited continuously, was unable to speak, felt acutely giddy and kept turning to the right. She also seemed to be unable to see properly. There was, however, neither headache nor tinnitus.

About a week later her vision improved materially, no double vision having occurred at any time. Her voice also improved, though it is still hoarse.

About two months ago, or more, the patient noticed a tingling, burning sensation over the whole of the left side of the body and left limbs, and on both sides of her face. This has been especially painful round the right eye and the mouth and in the tongue. From the time of the original ictus she has had difficulty in swallowing solids, and still

has to "wash her bread and butter down with tea." In walking she still edges to the right, but as she never walks without help she has never actually fallen. At no time has there been any paralysis in the limbs.

Present Condition on Examination.—**Cranial Nerves.** 1. No defect on either side.

2. Optic discs clear.

3. 4. 6. No nystagmus in any direction. The pupils are of medium

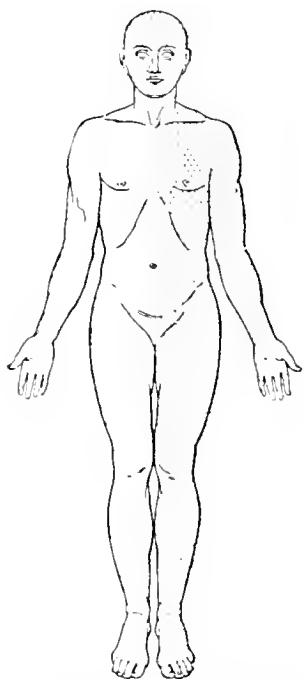


FIG. 1.—Subjective paraesthesia of "tingling" and "burning."

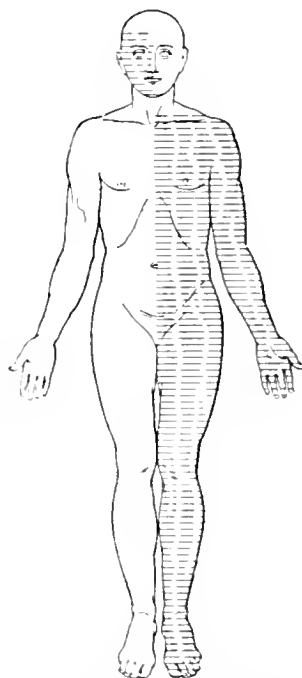


FIG. 2.—Diminution of tactile sensibility.

size, the right distinctly smaller than the left: both react to light, but the former does not dilate well with shading; there is some ptosis of the right upper eyelid and some enophthalmos of the right eye.

5. Motor part normal. For sensory, see below.

7. No asymmetry in the upper part of the face: doubtful difference in the lower part, the teeth being sometimes shown better on the right side, apparently.

8. No tinnitus or deafness. On rotation tests to the right, duration of nystagmus forty-six seconds, to the left, thirty, the normal being in each case twenty. Excessively giddy after rotation to the right.

9. No anæsthesia of the pharynx to touch, but distinct diminution to pin-prick on the right. Difficulty in swallowing solids.

10. Paresis of the right half of the soft palate, and complete paralysis of the right vocal cord.

11. Normal.

12. Tongue is protruded straight.

Special Senses. — Taste. Sugar and salt not recognized on the

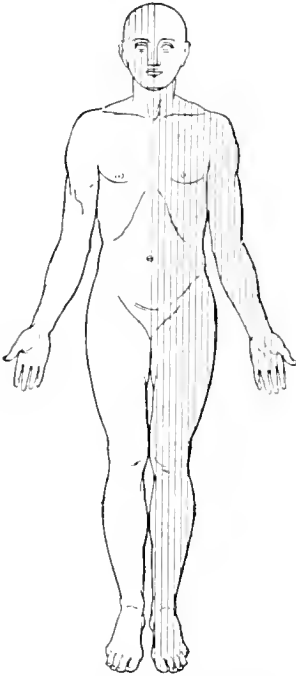


FIG. 3.—Complete loss of pain sensibility.

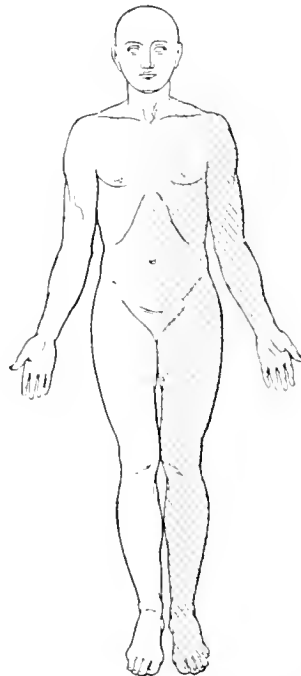


FIG. 4.—Loss of appreciation of cold stimuli.

right half of the tongue, either anteriorly or posteriorly. Left side of tongue normal.

Motor System.—No limb paralysis or paresis. No inco-ordination shown in finger-nose, knee-heel, or finger-finger tests. No dysdiadochokinesis. In walking, patient tends always to the right, moves slowly, and not without aid.

Reflexes. — Arm-jerks present and equal; knee- and ankle-jerks moderate, and equal on the two sides. Double plantar flexor response.

Sensory System. — *Subjective.* Subjective sensations of tingling and burning over the whole of the left side, including the face, head, and neck, and over the right side of the face, in the mouth, and in the tongue. This paræsthesia is particularly acute round the mouth and the right

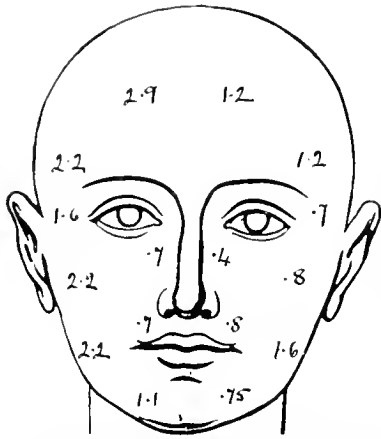


FIG. 5.—Diminution of painful pressure over right side of face.

eye. Over the latter areas pressure or rubbing intensifies the sensation, which becomes painful (*Fig. 1*).

Objective. — 1. Touch. Touch, tested with cotton-wool, is diminished but not lost over the left half of the body to the neck (not the left face) and over the right half of the face (*Fig. 2*). Localization is always correct. The corneal sensitivity and reflex are much reduced on the right. No impairment of touch over the tongue, buccal mucous membrane, or pharynx. Nasal mucosa less 'tickly' on the right.

2. Pain. Complete loss of pain sensibility over the right side of the face, right half of tongue, and left half of body to neck (*Fig. 3*). Prick everywhere felt as pressure. Pressure on the right eyeball not painful. In the right half of buccal mucosa and right side of the pharynx pin-point sensation is much reduced but not lost. Localization is everywhere correct.

3. Temperature. Heat stimuli (about 45°C .) recognized everywhere, on both sides of face and body. Cold (about 7°C .) completely lost over left half of body, and left limbs, except towards the upper limit of body (*Fig. 4*), where it is felt as 'a little cooler' than the hot tube. In addition, in this area occasional complete mistakes with cold tube made (about one in four trials). Localization correct in every instance.

4. Tactile discrimination. Equal on the two sides over the face and body. No constant differences found as between the right and left limbs.

5. Deep sensibility. Is able to recognize small movements of any joint on either side. No loss of sense of position or of passive movement.

6. Deep pressure pain. Tested with Cattell's algometer, greater pressure required to produce pain on the right half of the face and the left half of the body. In some readings the difference was very slight indeed, in others it was more noteworthy (*Figs. 5 and 6*).

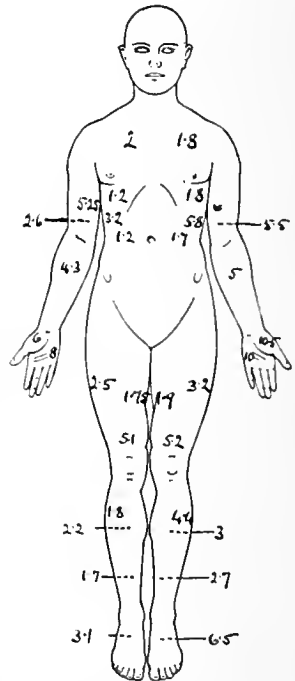


FIG. 6.—Diminution of painful pressure over left half of body and left limbs.

7. *Pallæsthesia*. Diminution of vibration-sense over the whole of the face and head and over the left half of the body. On the right side, the 'trembling' sensation is everywhere recognized.

8. *Sense of weight*. Tested with different coins, no recognizable differences between the two sides.

9. *Stereognosis*. Present and normal on the two sides.

Cervical Sympathetic. Paralysis of the right cervical sympathetic, with narrowing of the palpebral fissure myosis, and enophthalmos on that side. No difference, however, in sweating or flushing as between the two sides of the face, except possibly that the right eye contains more moisture than the left and tends to 'weep' with somewhat greater freedom than the other.

Heart.—Long rumbling presystolic murmur at the apex, with accentuated pulmonary second. Systolic B.P. 140 mm. No sugar or albumin in urine; blood, Wassermann test negative.

COMMENT.

There can be no doubt, we think, that this case belongs to the group of posterior inferior cerebellar artery occlusion. The chief residual symptoms, viz., crossed anæsthesia, paralysis of the motor tenth (palate and vocal cord), and central paralysis of the cervical sympathetic, point unmistakably to involvement of the lateral aspect of the medulla in the vicinity mainly of the *formatio reticularis*. In view of the endocarditis from which the patient has been suffering for some years, and of the abruptness of onset of the attack, we regard the pathological lesion as in all probability embolic.

If not entirely classical in its symptomatology, the case none the less presents the usual salient features of the symptom-complex of lesions in the vicinity mentioned. Brief allusion may be made to some of these.

1. The persistent titubation or lurching to the right may be set down to implication of the vestibulospinal tract: it is not likely the lesion has spread so far forwards as to have involved the neighbourhood of the group of nuclei from which the path descends. There is no sign, further, of concomitant disorder of the auditory part of the eighth nerve. Some degree of vestibular impairment is indicated by the result of the rotation tests, however, and vertigo has throughout been prominent in the picture: it is a question, therefore, whether all can be attributed to the vestibulospinal tract, though there is no doubt of the disturbance of the vestibular mechanism.

2. In this connection the relative absence of cerebellar symptoms on the right side is noteworthy, since crossed olivo-cerebellar fibres run

through the region presumably diseased, while the spino-cerebellar are to be found at the margin of the bulb at the same level. Apart, however, from the fact that at the outset cerebellar symptoms might have been present, subsequently to recede (a not infrequent occurrence), it should be remembered that in some cases examined pathologically (e.g. one recorded by R. M. Stewart¹) the softened area has not always extended actually to the edge of the medulla, being situated slightly more mesially. Hence the spino-cerebellar tracts might escape.

3. The loss of taste on the right side of the tongue, anteriorly and posteriorly, may be assigned to implication of the nucleus solitarius in the softened patch. As a rule it is just on the margin of the area involved by occlusion of the posterior inferior cerebellar, and may or may not be caught. The work of Nageotte,² it may be remembered, has shown that the nucleus solitarius (or gustatorius) receives below a large number of fibres coming from the trigeminal nerve, hence some at least of the loss of taste in our patient's case may have had a trigeminal origin.

4. The paralysis of the cervical sympathetic on the same side as the lesion demonstrates an uncrossed connection with the spinal centre of Budge at the cervico-dorsal junction. It is of interest mainly because there is good clinical evidence here of dissociation of function at a level corresponding to the mid-medulla. No difference in sweating or flushing on the two sides of the face was observable, whereas in other instances of the syndrome (e.g. that recorded in detail by Kinnier Wilson³) one side of the face has been bathed in sweat while the opposite one has been dry. On the other hand, we should like to refer again to the fact that in our patient the right eye was always more moist than the left, though no facial paresis was present. The sympathetic supply of the lachrymal gland is from the cervical sympathetic, its autonomic (para-sympathetic) supply *via* the sphenopalatine ganglion (Higier⁴): one might suppose that in some way the dryness which is said to follow paralysis of the cervical sympathetic may on occasion be over-compensated.

5. The homolateral paralysis of palate and vocal cord (syndrome of Avellis) is caused by impairment of function of the nucleus ambiguus or the efferent fibres from it.

6. We cannot do more here than allude to some of the interesting sensory phenomena exhibited in our case.

The relative preservation of tactile sensibility over the right face, and the correct localization of touches, suggest that the fibres conveying these impulses do not pass into the descending root of the fifth, or at least cannot go far down; they may proceed directly to the chief sensory nucleus of the nerve.

The loss of pain sensibility over the right face, coupled with the normal condition of thermal sensibility, indicates a dissociation of these functions in the descending root of the fifth, or, conceivably, in the

quinto-thalamic path derived therefrom; we cannot say which in the present instance is the more likely.

As for the condition of sensibility on the left side of the body, the complete preservation of appreciation of warm stimuli and the loss of cold must similarly be taken to indicate the possibility of dissociation of thermal sensation in the spino-thalamic tract or lateral lemniscus, as has, indeed, been noted often enough previously. The question of localization in the medullary part of the spino-thalamic path is very difficult, as Bergmark⁵ has recently emphasized: perhaps our case may be taken to suggest that pain is most mesial, then comes cold, then comes heat laterally. Yet Bergmark very justly says a dorso-ventral localization ought also to be considered.

The existence of 'burning' paræsthesiæ over the left half of the body, in the area where, objectively, appreciation of the opposite sensation, viz., cold, is lost, is of interest in view of the speculation of Hughlings Jackson that there is in such cases an 'antagonism of corresponding opposites'; loss of one leads to over-accentuation of the other.

The relative preservation of touch and of its normal localization on the left side, as of muscular sense, indicates that the median fillet is intact. The diminution of the vibration sense, on the other hand, is interesting, since our case possibly suggests its localization with pain and temperature in the lateral fillet, contrary to what might have been expected.

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Editorial.

MENTAL HYGIENE.

MEDICINE during the past few decades has to its credit a remarkable development of insight into infective diseases and disorders of metabolism. Investigators have concentrated upon certain mechanisms, upon special organs and systems, to good purpose. The patient himself has been provisionally ignored; he has been merely the incidental battlefield of a bacteriological conflict, or the irrelevant container of fascinating bio-chemical processes. The prestige of discoveries made along these lines has encouraged the injudicious to formulate practically all ailments, even the psychoneuroses, in terms of internal medicine, with no reference to the integrative levels of the instincts, the emotions, the personality. It required the psychoneuroses of war-time, the 'war-neuroses,' to bring home to the internist the fact that the phenomena of human sickness cannot be reduced to the simple terms of the bio-chemical or bacteriological laboratories. The study of the patient himself has acquired a new respectability. The physician with satisfactory training no longer catalogues symptoms or thinks in terms of disease-entities, but considers his problem to be the handicap of the individual in the light of the life-situation.

From the point of view of the study of the individual patient, this has meant a systematic analysis of his constitutional make-up, of the influence of early experiences, of his attitude towards the major issues of life, of the special stress and strain of the life-situation, domestic, social and industrial, as well as a study of his component organs and systems. From the point of view of his treatment it has meant a consideration of the influences which modify emotional values, remove undesirable inhibitions, stimulate and develop latent sources of power. From the point of view of preventive medicine, it means the introduction into the field of hygiene of those same factors which curative medicine had for so long neglected. Mental hygiene deals with this aspect of preventive medicine. The term mental hygiene, which merely indicates hygiene adequately conceived, may seem to some to have a disconcerting flavour of the ethical and the hortatory. It may seem to some to lack a definite programme, while hygiene as ordinarily understood calls up a variety of programmes. There is the hygiene of the home, of the school,

of the factory. There is pre-natal hygiene, baby hygiene, child hygiene; there is the hygiene of the mouth; there is sex hygiene. Each of these terms suggests a more or less concrete programme for dealing with problems generally recognized. Mental hygiene need not fear comparison with other forms of hygiene either in regard to concrete problems or definite programmes. Mental hygiene insists that in all programmes of hygiene attention should be paid to the health of the individual as well as to that of his organs, to his emotions and mental attitudes as well as to his nutrition and physical posture. In a programme of school hygiene the child himself shall be considered as well as his teeth and tonsils; his instinctive and emotional problems, his moods and his social reactions, his inhibitions and his waywardness shall receive as intelligent attention as his vision and his nutrition. In industrial hygiene, the individual worker with complex human cravings, dissatisfactions and compensations, shall not be lost sight of while we arrange for ventilation and illumination and the elimination of noxious chemical agents. In the hygiene of the home, it shall be incumbent on the worker to have in mind not only problems of nutrition and of infection, but problems of faulty habit-formation, and of false emotional values which may permeate the domestic atmosphere.

In order that preventive medicine may carry out its task satisfactorily, it must organize the same facilities for the early recognition and treatment of nervous and mental disorders as for that of all other disorders. In order that the hygiene of the community may be placed on a satisfactory basis, each medical school must see that its graduates receive an adequate training in the basal principles of psychiatry. In order that school hygiene, industrial hygiene and home hygiene may develop their latent possibilities, it is necessary that the basal principles of mental hygiene be widely disseminated, not only among physicians, but among teachers, nurses, *personnel* workers, and among that large army of workers, more or less trained, who carry on the labours of our various social organizations in touch with the homes of the people.

Mental hygiene includes among its problems that of the large amount of ill-health throughout the community due to nervous or mental disorders, often masquerading under the form of physical invalidism. It includes those deviations of human behaviour which are usually merely considered from ethical or legal standpoints, such as delinquency, alcoholism, prostitution, vagrancy, etc.; it includes many social phenomena which are very often dealt with on the basis of purely economic principles or on very general lines, phenomena such as the various manifestations of social unrest, of embitterment between classes, of strikes in various industries, of disturbances inside the individual workshop and factory; it includes the deviations from normal human behaviour which are noticed in the formative period of

human life, in the pre-school and in the school period, deviations which are noticed by the teacher, but which are seldom brought to the attention of the school physician or school nurse, and to deal with which the school physician and the school nurse, as a rule, have had quite inadequate training.

With problems so wide as those referred to, mental hygiene might seem to have a task for which no adequate programme could be outlined. The same might perhaps have been said with regard to hygiene in general one hundred years ago. As a matter of fact there are certain definite steps that require to be taken and which it only requires some earnestness and some co-ordination to take successfully. The central condition is that every medical school and every training school for nurses should give to the study of psychiatry and of psychiatric nursing the importance which it demands, so that not only shall there be trained psychiatrists developed, but every physician, whether he be general practitioner, school physician, factory physician, army or naval surgeon, or public health officer, shall realize that the behaviour of the individual comes within the scope of his professional attention.

Another source of influence which will radiate widely throughout the community is the department of psychology in the universities and in the normal schools. When each department of psychology in these institutions includes not merely the traditional academic psychology, but also the more practical body of knowledge dealing with human behaviour, every student who shall have passed through a university or normal college to enter industry or one of the professions, whether it be teaching, law, the Church, or medicine, will have some insight into the biological foundations of human behaviour, and will be able to offer efficient co-operation in promoting those measures of mental hygiene endorsed by the authorities especially concerned with these matters.

Abstracts.

Neurology.

NEUROPATHOLOGY.

- [1] The pathological physiology of cerebral concussion, with observations on allied conditions (Die pathologische Physiologie der Hirnerschütterung nebst Bemerkungen über verwandte Zustände).—KNAUER and ENDERLEN. *Jour. f. Psychol. u. Neur.*, 1922, xxix, 1.

THE difficulties enshrouding the pathological physiology of cerebral concussion are to some extent dispelled by this long and elaborate paper, based on the results of innumerable experiments, mainly with dogs, and correlated with experiences of clinical cases of war and other origin. A full account is given of the technique employed, the animals being narcotised and curarised, the effects of blows on the head being observed by appropriate apparatus comprising the registration of the general blood pressure, the volume of the brain, the venous return from the brain, the volume of the abdominal viscera, etc.

Some fifty-eight experiments were made on twenty-three animals. The authors' first conclusion is that an immediate result of a severe blow on the head is usually a sudden increase, less often a sudden decrease, in the amount of the circulating cerebral blood, produced by action on the heart and vessel centres in the medulla oblongata, *via* the cerebral vasomotor apparatus. This immediate effect is rapidly followed by a more or less prolonged state of reduction in brain-volume and relative emptiness of the cerebral vascular system, in all probability due to diminution of vasomotor tonus. Since the vessels, in this state, will nevertheless respond to the constricting action of adrenalin, it seems clear that the cause of the loss of vasomotor tone is central, i.e., by action on vasomotor centres in the medulla, and so on vasomotor nerves, which can be shown to be in a state of reduced excitability.

The explanation of the sudden loss of consciousness in severe cerebral concussion or commotion is fully examined. It cannot in its entirety be put down to the vascular change as specified above; this at the most is an accompanying but not a causal phenomenon. The authors adduce interesting evidence which suggests that the coma is the immediate consequence of action on cerebral neural elements themselves, and that the site of this action is not solely cortical (the condition of decerebrate rigidity is very different from that of coma), nor medullary, nor mesencephalic; action must implicate cortex, midbrain, and medulla more or less simultaneously and completely to produce the clinical picture of coma from concussion.

S. A. K. W.

- [2] Studies in the pathological anatomy of 'Landry's paralysis' (Studien zur pathologischen Anatomie der 'Landry'schen Paralyse').—GRÜNEWALD. *Jour. f. Psychol. u. Neur.*, 1922, xxix, 55.

A USEFUL précis of a large number of reported cases of Landry's paralysis from about 1905 is presented to show the extreme pathological indefiniteness of the condition, precise enough though it appears to be clinically—an acute, often ascending, flaccid palsy of the limbs and trunk, without sensory disorder and usually without involvement of the sphincteric reflexes. The author's own case is one of the remarkable group associated with hæmaturia, and is worked out with the greatest minuteness; its documentary value is considerable. Such cases have been classed with polyneuritis (by Harris and others), and it is perhaps matter for regret that the title of this paper does not indicate the nature of the rare case therein detailed.

Briefly, the changes in the peripheral nerves were those of 'névrite segmentaire périaixile,' in combination with ordinary secondary or Wallerian degeneration. The former is characterised by local myelin disintegration with overgrowth of the protoplasm and nuclear elaboration of the cells of the sheath of Schwann. In the central nervous system were found acute degeneration of the cells of the lumbar and dorsal cord, regressive changes, glial proliferation, Wallerian degeneration, and transudative alterations in the vicinity of vessels. Similar changes were present in the cervical cord, and to a less extent in the brain. A long discussion on the nature of these alterations is concluded in the decision that they represent acute toxi-degenerative and not inflammatory processes.

Landry's paralysis is a syndrome encountered clinically in cases of poliomyelitis, myelitis, polyneuritis, and epidemic encephalitis. Pathologically it ranges from a negative or almost negative finding to the fully developed changes of a meningo-encephalo-myelo-neuritis. The author accordingly is convinced that etiologically and pathologically the expression 'Landry's paralysis' is meaningless.

S. A. K. W.

- [3] Familial hypertrophic neuritis and neurofibromatosis (Familiäre hypertrophische Neuritis und Neurofibromatose).—BIELSCHOWSKY. *Jour. f. Psychol. u. Neur.*, 1922, xxix, 182.

THIS interesting paper is based on a critical examination of the description (supplemented in one instance by the examination of sections loaned to the author) by various writers of the pathological appearances in cases of hypertrophic neuritis which they have published. It is a somewhat bold procedure to challenge the interpretations of the writers themselves when the challenger has apparently no personal material to support his conclusions, but Bielschowsky's position as a neuropathologist is pre-eminent and his analysis of the subject peculiarly instructive.

Briefly, his thesis is that he is surprised to find that no one, it seems, has thought of correlating the findings in familial hypertrophic 'interstitial' neuritis with those of Recklinghausen's disease, especially with that form known after Verocay's researches as 'neurinomatosis.' Examination of the

former shows undoubtedly, according to Bielschowsky, that the hypertrophy is due to the appearance of concentric rings round the axones: they look as if they were hypertrophied myelin sheaths, whereas in reality they are made up of an almost homogeneous or extremely fine granular substance in whose periphery the Schwann cells are embedded. In this plasma-like ground-substance minute fibrils can be differentiated, and these constitute the ectodermic 'nerve-fibre-tumour' appearance characteristic of neurinoma. The process appears to commence by proliferation of the Schwann nuclei in given Ranvier segments of the nerve, with simultaneous increase in volume and thickening of the cytoplasm of the Schwann cells in the same segments. Hence concentric lamellae, producing an 'onion-skin' appearance, eventually develop, being laid down, presumably by some as yet not recognized morbid biochemical process, within the Schwann sheaths, a condition found in no other variety of neuritis. The process is not inflammatory but blastomatous, and is entirely analogous to what is found in so-called 'polycentric (peritubular) neurinomatosis.' In a word, the tendency to blastomatous proliferation within the Schwann sheaths over the whole extent of the nerve is identical with the limited, local, condition found in the variety of Recklinghausen's disease known as neurinomatosis. It is of interest to note the more or less constant presence of minute regenerating nerve-fibrils (quite distinct from the neurinomatous fibrils) within the Schwann sheaths, often in enormous numbers: as a rule, they, too, eventually degenerate, as do the original axones of the nerve, from continuation of the morbid process, but their occurrence may explain the often relatively well-preserved function of hypertrophied peripheral nerves.

The term 'interstitial,' therefore, is undesirable, inasmuch as by far the larger part of the hypertrophy is of ectodermic and not mesodermic origin: the part played by the connective tissues is quite secondary. The hypertrophy of familial hypertrophic neuritis is a universal peritubular neurinomatosis, continuous from periphery to roots.

S. A. K. W.

- [4] (The 'paregoric reaction' in the cerebrospinal fluid (Étude de la réaction de l'éllixir parégorique avec le liquide céphalo-rachidien des paralytiques généraux).—R. TARGOWLA. *L'Encéphale*, 1922, xvii, 567.

THE 'paregoric reaction,' which is closely allied to the colloidal benzoïn reaction, consists simply in adding a few drops of 'paregoric' to a dilution of cerebrospinal fluid in distilled water. In a technique previously published, the author used five tubes containing 1 c.c. of dilutions of $\frac{3}{4}$, $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$ and $\frac{1}{16}$ of C.S. fluid in distilled water, and added 0.2 c.c. of paregoric to each tube. Normal fluids gave no precipitation of the paregoric in the first two and last of these dilutions, with varying degrees of precipitation in the third and fourth tubes. The fluids of general paralytics, on the other hand, gave complete or partial precipitation in the first four tubes.

Targowla has now altered his technique and uses only one tube, in which are put 0.25 c.c. of distilled water, 0.75 c.c. of the C.S. fluid to be tested, and 0.3 c.c. of paregoric: a control tube receives 1 c.c. of distilled water and

0.3 c.c. of paregoric: the tubes are then shaken well and are read at the end of twelve to twenty-four hours.

In sixty-three out of sixty-five cases of general paralysis the reaction thus performed was positive, i.e., precipitation occurred in the tube containing the fluid to be tested. The two negative cases were tested during long remissions of symptoms. We are told that the reaction was always negative with the cerebrospinal fluid of non-parietic patients, but no figures are given of the number or the nature of the cases examined.

J. G. GREENFIELD.

- [5] The choroid plexuses in organic disease of the brain and in schizophrenia.—S. KITABAYASHI. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 21.

THE following groups of pathological alterations are recognizable in the choroid plexuses: (1) Alterations having their origin in the interstitial and perivascular mesodermal tissue (proliferation, cystic degeneration, vascular processes, etc.) capable of bringing about secondary transformations of ependymal cells; (2) chronic and acute alterations arising in the glandular ependymal tissue, causing primary destruction of the protoplasm, followed by that of the ependymal cells, and by sclerosis and atrophy *en masse* of complete groups of these cells. These alterations are generally accompanied by atrophic processes in the ventricular ependyma and the subependymal substance, and also by the penetration of pathological products into the nervous parenchyma; (3) mixed mesodermic and ectodermic alterations.

The mesodermic type of alteration of the choroid plexuses is less noxious and may remain latent longer. It is, nevertheless, probable that if it goes beyond certain limits it may give rise to conditions of somnolence, stupor and mental confusion. On the other hand, the ectodermal (or mixed) type of alteration is more dangerous for the intimate physiology of the nervous processes. In cases where alterations of the glandular and ventricular ependyma are advanced and diffuse (particularly those in the fourth ventricle and in the inferior horn) they are accompanied by serious mental trouble, particularly affecting the emotional life, and by acute as well as chronic states of delirium with hallucinations, obsessions, negativism, etc. That the lesions of the plexus cause the mental symptoms is unproved and unlikely, but the importance of the influence of such lesions of the plexus on the cortex is unquestionable.

R. G. GORDON.

- [6] Further observations on the normal and pathological histology of the striatal system (Weitere Bemerkungen zur normalen und pathologischen Histologie des striären Systems).—BIELSCHOWSKY. *Jour. f. Psychol. u. Neur.*, 1922, xxvii, 233.

1. *Chronic Chorea*.—A useful summary of recently published cases of Huntington's chorea, examined by modern methods by various workers, is followed by an account of the findings in four personal cases. Special attention is directed to the fact that the syndrome of chronic chorea may be unaccompanied clinically by mental symptoms and pathologically by cortical changes. The main features of Bielschowsky's cases were as follows: little recognizable

change in the cortex : pronounced loss of cells in putamen and caudate, such cells as remained being chiefly of the large type and exhibiting much pigmentary degeneration ; great overgrowth of fibre-forming glial cells everywhere in the same ganglia : slight tendency to cystic or porous degeneration in the tissues, with degenerated blood-vessels in relation ; products of degeneration not at all obvious, with the exception of fatty inclusions in the cytoplasm of the fibre-forming glial cells : notable vascular changes, mostly thickening of capillaries (capillary fibrosis), the more obvious, perhaps, because of the general shrinkage of the putamen-caudate, and also some capillary new-formation and connective-tissue ' bridges ' between neighbouring capillaries : a characteristic status fibrosus of the ganglion, produced by loss of myelinated fibres (intra-striatal and striofugal) and assembling of those remaining into thicker strands owing to the shrinkage of the ganglion—hence a general denser and darker coloration with myelin stains ; similar but slighter alterations in the globus pallidus : corpora arenacea and corpora amylacea in both parts of the corpus striatum.

There is no evidence of any selective action of the morbid process on the small-cell systems of the ganglion, as Ramsay Hunt has supposed. Bielschowsky claims that in chorea chronica this histological picture is " clear-cut and constant," yet he is compelled to allow that the status fibrosus occurs in cases which do not belong clinically to chronic chorea : it is seen, e.g., as a sequela in some cases of infantile encephalitis, and he cites a personal case where this pathological condition was found and in which neither athetosis nor chorea was present clinically.

2. *Progressive Rigidity*.—A case is given in great pathological detail in which a boy of six began to suffer from generalized choreiform movements : these some years later gradually ceased, to be replaced by progressive rigidity of limbs and trunk, and in fact of the whole of the skeletal musculature. Pathologically, diffuse changes were found mainly in the third cortical layer : the putamen-caudate was in a condition of status fibrosus, while the globus pallidus was notably degenerated and shrunken, much more so than in Huntington's chorea : pronounced chronic cell-changes were present also in the corpus Luysii, substantia nigra, and nucleus ruber. The argument is that the involvement of the pallidal and subpallidal centres is responsible for the progressive rigidity, masking the choreiform movements. It is held that in cases of Huntington's chorea in which the globus pallidus is implicated the degree of involvement of the latter has not been sufficient for the development of rigidity, but the evidence offered is not convincing. Bielschowsky argues that in decerebrate rigidity the putting out of action of the 'twelve- and mid-brain centres belonging to the pallidal system is a factor in the production of the rigidity, but the selective nature of the latter in decerebrate circumstances is different from the generalized hypertonus of striatal cases.

Reference is made to the Ramsay Hunt hypothesis in connection with juvenile paralysis agitans, and Bielschowsky criticizes it adversely.

3. *Paralysis Agitans*.—The description given is based on the investigation of six typical cases of the disease. The chief alterations were : constant loss of cells (both types) in putamen-caudate, and in globus pallidus ; chronic

fatty and lipoid degeneration of the cells remaining; fatty points surrounding the numerous glial nuclei and seen in the nuclei of the walls of the smaller blood-vessels; products of degeneration in adventitial cells and in occasional compound granular corpuscles; diminution and loss of myelinated fibres, more notable in globus pallidus than in putamen-caudate, and also in the ansa lenticularis and in Forel's field; angiosclerosis of the larger blood-vessels, and capillary fibrosis, both as a rule prominent; in association with these, changes in the ground-substance of the ganglion, a sort of rarefaction analogous to a status praeribatus or cribratus, and histological evidence of venous stasis and interference with lymph percolation through tissue spaces—these changes more obvious in the putamen-caudate than in the globus pallidus; abundant products of defective metabolism and degeneration, a question standing much in need of further histological and chemical research.

The author considers it a mistake to regard the pathological process in paralysis agitans as limited to the corpora striata, since he has seen degenerative changes also in cortex, optic thalamus, corpus Luysii, substantia nigra, and in various areas in pons and medulla. He confesses his inability to deduce any precise explanation of the rigidity and tremor from a consideration of his pathological findings, though he thinks it justifiable to hold that the striatal changes form the anatomical basis of the clinical syndrome.

4. *Pseudosclerosis and Wilson's Disease.*—In his discussion on these diseases and on their possible interrelation, Bielschowsky points out clearly, as he has done before, the essential dissimilarity between the chronic blastoma-like glial hypertrophy of the former and the acute or subacute parenchymatous and interstitial degeneration of the latter: he says in so many words that 'in their original forms the two diseases have nothing in common.' He discusses cases published subsequent to Wilson's papers in which apparently a combination of the two distinct processes has been noted (Spielmeyer, Stöcker), and shows conclusively that there can be no specificity attached to the large glial cell-forms found by Alzheimer and others in pseudosclerosis, since they have been seen in a number of other conditions. In spite of the work of Spielmeyer the histopathological differences between the two diseases are still unbridged. Bielschowsky gives the details of a personal case of Wilson's disease in which, notwithstanding his careful search, he has completely failed to find any evidence of the presence of the giant glial cells as seen in some cases (not all) of pseudosclerosis.

The paper is of great importance and value, yet it serves to show how far the morbid histology of these interesting striatal diseases is from shedding light on the physiology of their symptoms. S. A. K. W.

[7] The pathological anatomy of paralysis agitans (Zur pathologischen Anatomie der Paralysis agitans). FÜNEGELD. *Zeit. f. d. g. Neur. u. Psychiat.*, 1923, lxxxi, 187.

THE case described is that of a man of sixty-seven, the duration of whose symptoms, in every way characteristic of the disease, did not extend beyond fourteen months; a complication was present in the form of a degree of senile dementia.

Cortex.—Marked shrinkage, fatty degeneration, and pigmentary atrophy of many of the cells of the third, fifth, and sixth cortical layers, especially in the frontal region and to a less extent in the occipital.

Basal Ganglia.—In putamen and caudate, which were not obviously reduced in size, moderate atrophy of the small cells and notable degeneration of the large cells, of the usual chronic type, with similar finding in the globus pallidus, especially dorsally and externally. The cells were shrunken, stained more darkly, had lost their normal contour, their processes were reduced and their nuclei pale and poor in chromatin. Glial nuclei were not increased in numbers. Lipoid degeneration was readily seen in the cytoplasm of the small cells, in little collections round the glial nuclei, and in the lymphatic sheaths of the vessels. No obvious reduction in myelinated fibres, no obvious increase of glial elements. Pigmentary degeneration of many of the glial cells, enlargement of perivascular spaces, and changes in vessel walls (hyaline and other forms of degeneration). No particular alteration in the ansa lenticularis. Marked reduction and degeneration of the cells of the nucleus substantie innominata; atrophy of the nucleus periventricularis. A moderate degree of pigmentary atrophy in the optic thalamus (chiefly ventral).

Regio Subthalamica, etc.—Reduction in size of the corpus larysi, with degeneration of its cells. Marked changes in the substantia nigra, and in the posterior third of the nucleus ruber. Similar degenerative processes in the nucleus dentatus of the cerebellum, the dorsal nucleus of the vagus, and of the cells in relation to the mesencephalic root of the fifth.

The author ascribes considerable importance to degenerative changes in the ground-substance of the basal ganglia, the result possibly of lymph stasis in the tissue synechium. He passes no comment on the interpretation of his findings, except to suggest that the changes in the corpus striatum are analogous to those of the cortex in senile dementia. The process at work in paralysis agitans, therefore, might be considered, in his view, a senile morbid process, with its incidence on the basal ganglia.

S. A. K. W.

- [8] Blood creatinin findings in five cases of corpus striatum disorder.—
T. RAPHAEL and F. C. POTTER. *Jour. Nerv. Ment. Dis.*, 1922, lv, 492.

Two cases of paralysis agitans, two of Huntington's chorea, and one of congenital double athetosis were examined, and it was found that the blood creatinin values were very definitely below the normal minimum, affording an indication of the possibility of concomitant alteration in muscle metabolism.

R. G. GORDON.

- [9] The histological changes in frozen nerves (Die histologischen Veränderungen in durchgefrorenen Nervenstrecken).—BIELSCHOWSKY and VALENTIN. *Jour. f. Psychol. u. Neur.*, 1922, xxix, 133.

THERE can be no doubt that local freezing of nerve trunks is the best procedure to ensure adequate interruption of function, for a sufficiently long period, without reduction of their power of subsequent regeneration. Analysis of the exact histological changes has been undertaken by the authors, who

experimented on guinea-pigs and dogs by exposing various peripheral nerves and freezing them with ethyl chloride for varying periods from one minute upwards. The first change, recognizable in twenty-four hours, is an action on the blood-vessels of the nerve: neural degeneration and regeneration can be seen by about the third day. The former consists in hyperæmia of the capillaries and smaller veins, with diapedesis of both whites and reds: within three days circulation is restored and the extravasated blood absorbed. The latter shows itself in breaking up of the myelin sheaths, fragmentation of the axons, and alteration of the cells of the sheath of Schwann into scavenger cells. The process of regeneration begins forthwith and is recognizable by the appearance of minute fibrillary processes spreading peripherally from the proximal ends of the fibrils of the injured axones, and by collateral branching somewhat more centrally than the extremities. There is to be found, after a fortnight, continued evidence of scavenging, in which the mesodermal elements of the endo- and peri-neurium take a prominent share, the reasons being that the extent of the reaction in the nerve passes considerably beyond the section actually frozen, while the rapidity of the degeneration is greater than in ordinary cases of neuritis or of Wallerian degeneration. By the fifty-sixth day the authors have obtained histological proof of complete regeneration by means of new fibres and myelin sheaths.

From the practical viewpoint of the treatment of neuralgia, etc., it is concluded that freezing is altogether preferable to alcohol injection where mixed nerves are concerned: alcohol produces a coagulation-necrosis which is sometimes never recovered from, and has the further disadvantage of tending to cause an intraneural neuroma-formation which may prove a complete barrier to restoration of function.

S. A. K. W.

SENSORIMOTOR NEUROLOGY.

- [10] The occurrence of tuberosc sclerosis of the brain and of hydrocephalus in association with precocious puberty (*La sclérose tubéreuse du cerveau et l'hydrocéphalie dans leurs relations avec la puberté précoce*).—KNUD H. KRABBE. *L'Encéphale*, 1922, xvii, 281, 437, 496.

KRABBE has observed two cases of tuberosc sclerosis of the brain, and one case of hydrocephalus associated with precocious puberty. Of the former, one case ended fatally at the age of four years, and the diagnosis of tuberosc sclerosis of the brain with some degree of microcephaly was established post-mortem. In the other case the patient, a boy of fourteen, was alive but progressively imbecile, and presented the typical sebaceous adenoma of the face. The case of hydrocephalus was only remarkable in that menstruation had commenced at the age of eight years: hydrocephalus, which originated in infancy, appears to have followed a mild attack of epidemic cerebrospinal meningitis. The patient died at the age of forty-four of pneumonia, complicated by glycosuria. Two cases of epilepsy are also described in which the onset of puberty was unusually early. Krabbe refers to the nine recorded cases in which a pineal tumour was associated with precocious puberty, and considers that the evidence they present is quite insufficient to prove any

relationship between the pineal and the sexual or endocrine glands: many cases of pineal tumour in children have shown no such precocious sexual development, and the results of experiments on the pineal body have been very contradictory. The most probable hypothesis for the association of intracranial disease with precocious puberty is, in his opinion, the assumption of some inborn 'constitutional anomaly.' This may either be, of itself, the cause of both classes of symptom, or may lead to precocious puberty when another factor, such as intracranial disease, is present.

J. G. GREENFIELD.

[11] **Progressive cerebral hemiplegia: its pathogenesis and differential diagnosis.**—A. GORDON. *Jour. Nerv. Ment. Dis.*, 1922, lv, 200.

UNDER this term is understood a condition in which a unilateral paralysis of cerebral type is established slowly and progressively, but in sections, commencing either in the upper or lower extremity or in the face. Five cases are described in which the paralysis developed slowly and gradually at first as a mere weakness in one limb, but imperceptibly grew more and more profound until a complete and total hemiplegia was established. Sensibility was invariably involved. Vertigo preceded, and often a severe attack heralded the onset of paralysis. Four cases showed degenerative lesions of the blood-vessels with extensive but circumscribed areas of oedema and softening. The other case proved to be a slow-growing tumour. A similar condition has been observed in aneurism of the basilar artery, uræmia and diabetes. Differential diagnosis between such cases and one of hæmorrhage between the corpus striatum and external capsule, and two cases of diffuse sclerosis of the cerebral motor system is discussed.

R. G. GORDON.

[12] **Thrombotic cortical amaurosis.**—II. MELLA. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 563.

A CASE of bilateral occipital thrombosis is described, presenting a condition which should be considered in all cases of amaurosis before such vague diagnoses as 'retrobulbar neuritis' and 'toxic amblyopia' are made in the absence of fundus pathology. The case tends to corroborate the views of Shellshear, who believes that the arteries of the forebrain have a functional distribution, and should not only be studied from the anatomical point of view, but in relation to their functional significance, which is probably of paramount importance. In the example here reported, complete loss of a single function, that of vision, resulted from symmetrical lesions of the occipital arteries.

R. G. GORDON.

[13] **Clinical pathologic report of a case of pons hæmorrhage (type Foville).**—G. B. HASSIN, H. ISAACS and M. COTTE. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 553.

THE comparative rarity of pontine hæmorrhage is pointed out and the various syndromes depending on the position and severity of the lesion are discussed. The patient in this case showed complete left-sided facial paralysis (of the peripheral type): paralysis of left conjugate lateral movements of the eyes

(persistent deviation to the right), that is, of the left external rectus and right internal rectus; contracted and fixed pupils; right-sided hemiparesis and hemianesthesia with involvement of sensation for pain, touch, position, stereognosis and localization, but with preservation of the temperature sense; involvement of problematical fibres from both vertical labyrinthine canals, and partial involvement of the fibres from horizontal canals, especially the left one. The post-mortem examination revealed a hæmorrhagic focus (three-fourths of an inch by one inch in size), in the left tegmental region of the pons, occupying an area containing the nuclei and roots of the sixth and seventh nerves, the left posterior longitudinal and prædorsal bundles, the reticular formation, the main or mesial fillet, and partly the fibres of the descending root of the fifth nerve. The spino-tectal and spino-thalamic tracts were also affected. The correlation between the symptoms and the pathological findings is discussed at some length.

R. G. GORDON.

- [14] The symptomatology of early disseminated sclerosis (Beitrag zur Symptomatologie der Sclerosis multiplex incipiens).—BÖHMIG. *Deut. Zeits. f. Nervenh.*, 1922, lxxv, 24.

THE author of this paper puts it forward as a rule of thumb that, provided syphilis be excluded, the diagnosis of disseminated sclerosis may be made with confidence if, in addition to signs of spasticity of the lower limbs and absence of the abdominal reflexes, any other sign of organic nervous disease is present. To any neurologist the fallacy of such a rule will be obvious; it would lead to the classification of cases of syringomyelia and many cases of spinal compression as cases of disseminated sclerosis. The only rule of thumb that might be applicable to this disease is a negative one, viz., that disseminated sclerosis should not be diagnosed unless the signs present cannot be explained without postulating more than one lesion.

J. P. MARTIN.

- [15] Progressive facial hemiatrophy with epileptic fits (Ein Fall von Hemiatrophia faciei progressiva mit epileptischen Anfällen).—BARKMAN. *Deut. Zeits. f. Nervenh.*, 1922, lxxv, 1.

THIS is a case of a young woman of twenty who, at the time of examination, showed a shallow groove, 1 to 1½ cm. wide, running just to the left of the middle line from the root of the nose back to the occipital bone. It had begun as a white line on the forehead, was first noticed when she was about eight or nine years of age, and had very slowly become wider and deeper. Barkman satisfied himself that the groove was caused by an atrophy of skin, subcutaneous tissue, and bone, and that there was some atrophy also of the skin and subcutaneous tissue of the left half of the forehead. The only positive findings otherwise were that the left pupil was a little smaller and the left palpebral fissure a little narrower than the right, that there was on the left a moderate degree of enophthalmos, and that, when the patient blushed, the left half of the face became more flushed than the right.

The patient had been subject since the age of thirteen to epileptiform fits, and these were always initiated by a right-sided visual, motor, and

sensory aura. On this account the author thinks it likely that, associated with the atrophy of the more superficial structures, there may be some affection—probably atrophic—of the left cerebral hemisphere.

As regards the etiology of the condition, he inclines, on account of the evidence of a defect of the sympathetic in this case, to the view that progressive facial hemiatrophy is of sympathetic origin.

J. P. MARTIN.

[16] **Epilepsy in pregnancy** (Über kortikale und genuine Epilepsie in der Schwangerschaft).—CURSCHMANN. *Deut. Zeits. f. Nervenh.*, 1922, lxxv, 93.

CURSCHMANN gives details of three cases in which epilepsy occurred only during pregnancy, eclampsia being excluded. He expresses the opinion that in certain cases there may be during pregnancy an irritability of the cortex, so that a source of irritation which is not normally sufficient to cause symptoms may then give rise to fits.

J. P. MARTIN.

[17] **The family K.—A study in hereditary ataxia** (Die Familie K.—eine Studie über die Vererbung der Friedreichschen Krankheit (hereditären ataxie)).—FRIEBEL. *Deut. Zeits. f. Nervenh.*, 1922, lxxvi, 111.

THE family K. presents a form of hereditary ataxia which is intermediate between the form described by Friedreich and that by Pierre Marie. It resembles Marie's form in many respects, but it is distinguished by the absence of optic atrophy and of gross sensory changes.

Friebel seems to have studied the family thoroughly. The common ancestor is known to have suffered from ataxia late in life. He had six children, of whom two suffered from the disease, and in them it appeared at the age of fifty. The third generation consisted of fifty members, five of whom had the disease in its fully-developed form, while two others suffered from nystagmus: the age of onset of the ataxia in this generation was from thirty to thirty-five years. The fourth generation consists of 192 members, only one of whom presents the full picture of the disease: a cousin shows a 'forme fruste,' and eleven other members suffer from nystagmus. The age of onset of the ataxia in this generation has been about twenty years. Few members of the fifth generation have yet attained the age at which the disease might be expected to show itself, and no cases have been discovered, but nystagmus has been found in one member.

It will be evident that the family shows no tendency to die out, such as is shown by families affected with the Sanger-Brown type of ataxy. It appears rather that the disease is exhausting itself, since only one fully-developed case is present in the fourth generation, whereas there were five in the third generation. The 'anticipation' of the disease in successive generations occurs also in the Sanger-Brown type of ataxia.

This paper is valuable not only as a study of familial disease, but also on account of the light it throws on a point in the etiology of nystagmus.

J. P. MARTIN.

- [18] Late cerebellar atrophy, mainly cortical: primary parenchymatous atrophy of the cerebellar lamellæ, primary atrophy of the palæocerebellum (De l'atrophie cérébelleuse tardive à prédominance corticale: atrophie parenchymateuse primitive des lamelles du cervelet, atrophie paléocérébelleuse primitive).—PIERRE MARIE, CH. FOIX, and TH. ALAJOUANINE. *Revue neurol.*, 1922, xxxviii, 849, 1081.

IN this important paper the writers describe a new disease which they have successfully isolated from the mass of obscure cerebellar affections and placed upon a sound anatomical and clinical basis. The main body of the material which forms their subject-matter is an investigation of five new cases which are here presented. In three the examination was complete on both the anatomical and clinical sides: one was investigated only from the clinical, and one other only from the anatomical aspect.

1. The morbid anatomy of the disease is distinctive. To the naked eye the cerebellum as a whole appears atrophied, but on close inspection it is seen that the atrophy, although symmetrical, affects certain parts of the organ much more than others. Thus the superior surface is more affected than the inferior, and of this the vermis much more than the lateral lobes. Moreover, the anterior parts are relatively more involved than the posterior. The disease clearly affects the lamellæ, which are thinner than normal, so that the superior surface in particular appears ragged, with abnormally deep sulci, and to the touch the lamellæ feel atrophied and hard. Complete sections through the organ, sagittal and horizontal, when stained by Nissl's method, demonstrate the paucity of cells in the diseased lamellæ.

On microscopic examination the most striking feature is the disappearance of the Purkinje cells, which in the regions most affected is complete, so that a relatively clear zone appears in Nissl-stained sections between the molecular and granular layers. In silver-stained sections this space is seen to be filled by the basket cells, which form as it were a continuous thick-set hedge unbroken by the appearance of Purkinje cells. The other elements of the cortex are relatively little affected. The cells of the granular layer are certainly less numerous, and of those that remain a number stain poorly; their fibres are fewer, with a corresponding effect upon the molecular layer. The white matter of the lamella is less rich than normal in myelinated fibres, owing to the degeneration of the Purkinje cells. There is little evidence of glial proliferation in the grey matter of the cortex: but in the white matter there is a marked increase of the fibrils which, running in the long axis of the lamella, form sheaths around the vessels. The central white matter of the cerebellum is intact, as also are the fibres of its three peduncles and the cells contained in its various nuclei of grey matter.

Minute examination of the brain stem reveals only one area in which any abnormality can be detected. This is in the inferior olive, in which there is an atrophy of the cells, with glial sclerosis and partial degeneration of the olivo-cerebellar fibres. These changes are found especially in the postero-internal part of the olive, this observation confirming those of Holmes and Stewart, who, from their studies of the olivary degenerations following

focal lesions of the cerebellum, concluded that the antero-superior part of the cerebellum corresponds to the postero-internal part of the olive. In summing up this part of their observations, the authors point out that the maximum incidence of the disease is upon the cortex of those parts of the cerebellum which are phylogenetically most ancient—the paleocerebellum of Edinger.

2. The clinical features of the disease are, in the opinion of the authors of the paper, also distinctive. The chief symptom is a disturbance of equilibrium, which is most evident when the patient attempts to walk, but is also present when he stands. The disease is one of advanced life, the mean age of the cases so far recorded being fifty-seven, with extremes of forty and seventy-five. The picture is one of a progressive cerebellar syndrome chiefly affecting the lower limbs in a symmetrical fashion. Thus, on systematic examination, the various tests for inco-ordination are found positive, the knee-jerk gives a graphic record of the cerebellar type, and a certain amount of hypotonia is present. Nystagmus is usually limited to a few nystagmoid jerkings. The speech is commonly affected, sometimes typically cerebellar. The handwriting is often jerky and irregular, despite the relative escape of the upper limbs from cerebellar defects. The rest of the neurological examination is substantially negative. The vestibular functions are intact. The intellect is unimpaired. An important exception must be made, however, in the case of Babinski's sign, which has been recorded as present on one or both sides in about half the cases. (In one of the cases investigated pathologically the Pal-stained sections showed some pallor of the pyramidal tracts.)

In a full discussion of the literature the authors distinguish between the various types of cerebellar atrophy, and have been able to find record of six cases, with full pathological notes, which they accept as belonging to the category which is the subject of their paper. Leaving on one side the cases of so-called cerebellar agenesis (which are usually associated with cerebral defects), and the acquired lesions of infective or arteriosclerotic origin, they propose the following classification for the true cerebellar atrophies:

1. The congenital atrophies, usually associated with idiocy.
2. The familial atrophies, of which the type is Marie's hereditary ataxy.
3. The acquired cerebellar atrophies: (a) Olivo-ponto-cerebellar atrophy; (b) Late cerebellar atrophy (mainly cortical); (c) Atrophy of the dentate system (Ramsay Hunt).

The remainder of the paper is devoted to a discussion of the differential diagnosis between these various diseases and the points of pathological and physiological interest arising out of the preceding pages. They point out that the correlation established between the localisation of the lesions and the nature of the symptoms in the new disease is at variance with the schema of Bolk. The paper is fully illustrated, and a complete bibliography is appended.

C. P. S.

[19] **Dystrophia myotonica sine myotonia.**—CURSCHMANN. *Deut. Zeits. f. Nervenhe.*, 1922, lxxiv, 157.

CURSCHMANN, in this paper, draws attention to the fact that not only can dystrophia myotonica (myotonia atrophica) go on indefinitely without

myotonia making its appearance, but that the absence of myotonia may even be a characteristic of the disease throughout a family. He gives particulars of a family in which three brothers were affected with the disease: in two of the brothers no evidence of myotonia could be found; in the third, myotonia was absent, except that a myotonic 'dimpling' to percussion was obtained in the tongue and in the muscles of the thenar eminences. Two of these patients, and a fourth brother, suffered from cataract, and cataract had occurred in four members of the previous generation, so that even without evidence of myotonia, with the characteristic distribution of the muscular wasting, the facial appearance, and the frontal baldness, the diagnosis was certain.

J. P. MARTIN.

- [20] A Case of Recklinghausen's disease with spinal symptoms (Ein Fall von Recklinghausenscher Krankheit mit Rückenmarkssymptomen).—PROESCHEL. *Zeit. f. d. g. Neur. u. Psychiat.*, 1923, lxxxii, 127.

THE case is that of a girl of sixteen, with the usual cutaneous manifestations of Recklinghausen's disease. In addition, slight atrophy of the hands and progressive spastic paraplegia were noted. Excision of one of the peripheral nerve tumours showed it to belong to the sub-group of neurinoma: it consisted of marked overgrowth of myelinated nerve-fibres, with none of connective tissue, glial tissue, or ganglion cells. Operation revealed two tumours at the level of the cervical enlargement, intradural but extramedullary. Death ensued seven days after the operation. At the necropsy tumours were found on the under-surface of the cerebellum, in the thoracic spinal cord (intramedullary), on some of the dorsal roots, in the cauda equina, on the inner aspect of the dura, and notably in the wall of the colon, presumably developing in connection with the plexus myentericus. Numerous tumours were found as spindle-shaped swellings on many peripheral nerves. All, without exception, and whatever the site, belonged histologically to the interesting class of neurinoma, as described by Verocay.

In a number of cases of neurofibromatosis complicated with spinal growths, the latter have belonged to a different class from the former (glioma, fibroma, fibro-endothelioma, etc.).

S. A. K. W.

PROGNOSIS AND TREATMENT.

- [21] The prognostic significance of the condition of the cerebrospinal fluid in syphilitic cases showing pupil changes only (Weiterer Beitrag zur Frage der prognostischen Bedeutung des Verhaltens des Liquor spinalis bei isolierten syphiligen Pupillenstörungen).—WÜLLENWEBER. *Deut. Zeits. f. Nervenhe.*, 1922, lxxiv, 350.

FROM a study of twenty-eight cases in Nonne's clinic, Wüllenweber concludes that in cases of syphilis showing pupil changes only, the prognosis is very favourable when the cerebrospinal fluid is normal, and rather doubtful, but not definitely unfavourable, when the fluid shows alterations.

J. P. MARTIN.

- [22] The prognostic significance of changes in the cerebrospinal fluid in syphilis (Über die prognostische Bedeutung positiven Liquors bei spätlatenter Syphilis ohne neurologischen Befund).—FUCHS. *Deut. Zeits. f. Nervenhe.*, 1922, lxxv, 70.

THIS is a study of fifty-six cases which, when first seen, had presented no signs whatever of nervous disease, but had changes in their cerebrospinal fluids, and which were afterwards followed for a varying number of years. The average period between the date of infection and the date of the last examination or of death was 18·3 years.

It is estimated that of all syphilitics 5 to 6 per cent. develop tabes or G.P.I. (Matthes, Erb); but Fuchs found that of his fifty-six cases with changes in the cerebrospinal fluid 10½ per cent. developed tabes or G.P.I., another 7½ per cent. developed nervous disease of some kind, while 5 per cent. more died of syphilitic disease of the blood-vessels. Two-thirds of all who were affected showed signs between the seventh and twentieth years after infection, and these cases tended to progress more rapidly than those whose first signs appeared after a longer interval. The older the individual at the time of infection, the greater the probability of nervous disease and the more severe its course.

The number of cases examined altogether was 131, but it was only possible to follow fifty-six; it is interesting to note that in 29 per cent. of the 131 cases the Wassermann reaction was negative in the blood, though all the patients had changes of some kind in the cerebrospinal fluid.

J. P. MARTIN.

- [23] The treatment of general paresis by inoculation of malaria.—WAGNER-JAUREGG. *Jour. Nerv. Ment. Dis.*, 1922, lv, 369.

Ditto.—H. F. DELGADE. *Jour. Nerv. Ment. Dis.*, 1922, lv, 376.

CURES and remissions of G.P.I., often after periods of suppuration, have been described in the literature for the last 100 years. The recognition of the syphilitic origin of the disease has led to treatment by anti-syphilitic measures, both old and new, but these have done no more than delay the fatal issue.

The treatment of G.P.I. by Koch's tuberculin seemed to produce more remissions and delay the course of the disease. Doses of 0·5 grm. and even 1 grm. produced good results; better results still were obtained with typhus vaccine, and in 1917 the author started to inoculate cases of G.P.I. with the blood of patients with active tertian malaria. Of the nine patients so treated, the six whose cases were of an early type are still actively at work. Since then others have been successfully inoculated, one from another. One to four c.cm. of blood taken from a paretic during an attack of fever is injected subcutaneously under the skin of the back. Later experiments have shown that blood taken from a patient between the attacks is equally efficacious. Most cases showed typical malaria after an incubation period of six to thirty-six days, but a few seemed immune after repeated inoculations. After nine or ten attacks quinine treatment was started, and at the same time six weekly injections of neosalvarsan were given. The inoculated

malaria was much more easily cured by quinine than that caused by the bite of the anopheles, probably because of the asexual propagation of the plasmodium.

Complete remission occurred in more than 50 per cent. of the paretics selected for treatment. Disturbances of speech and convulsive attacks are specially benefited by the method. There was no alteration in the serum and fluid reactions, so it may be said these reactions have only a diagnostic and no prognostic value.

In the second paper the author reviews the literature and describes five cases of his own. Of these one died, but the others improved and three remain quite well to date.

R. G. GORDON.

Endocrinology.

- [24] A case of pituitary tumour of fourteen years' duration (Étude clinique et anatomique d'un cas de tumeur hypophysaire datant de quatorze ans).—P. SAINTON and E. SCHULMANN. *L'Encéphale*, 1922, xvii, 554.

THE case described is that of a man who died in 1921 at the age of thirty-five, after having for the previous fourteen years presented the ophthalmological picture of a pituitary tumour. He had constant headache, bilateral optic atrophy and homonymous hemianopia. In 1909 the right nasal field was reduced, and the left temporal field retained only perception and localization of light. Under treatment by x-rays in 1910 vision improved. The right nasal field enlarged to its normal size, and some colour-vision returned in the left temporal field. After this the patient was not seen again until a week before his death, which resulted from influenzal bronchopneumonia in January, 1921. In the interval he had continued his usual occupation of postman; apparently a fair degree of vision was preserved; he had a tendency to adiposity, but showed none of the signs of acromegaly.

The post-mortem examination revealed an enormous pituitary tumour which measured $7.5 \times 5 \times 4$ cm., and weighed 60 gm. It had hollowed out the sella turcica, which extended backwards as far as the jugular foramen. The structure of the tumour is described as an 'atypical epithelioma' of the pars anterior, and appears to resemble the majority of tumours of this part of the pituitary body. The thymus and thyroid glands were both large, and showed evidence of proliferation. The testicles were small and appeared to be undergoing premature senile atrophy.

The authors comment on the long duration and slow progress of the symptoms, which facts, along with the visual improvement, they attribute to the effects of radiotherapy. The case is not otherwise very noteworthy, but it exemplifies the close relationship which exists between the pituitary body and other ductless glands.

J. G. GREENFIELD.

[25] The surgical aspect of the pituitary syndromes (Les syndromes hypophysaires au point de vue chirurgical).—HARVEY CUSHING. *Revue neuro.*, 1922, xxxviii, 779–808.

This paper contains a *résumé* of the author's experience with pituitary tumours since the publication of his monograph upon the subject ten years ago. In his series of verified intracranial tumours, 780 in all, those in which the main symptoms have been those of dyspituitarism have amounted to 25 per cent.—this high proportion probably being due to the especial interest taken by Professor Cushing in this particular group.

He divides these into four categories :—

1. Pituitary adenomas—154 cases.
2. Congenital tumours of the cranio-pharyngeal pouch—33 cases.
3. Supra-sellar tumours of non-pituitary origin—20 cases.
4. Tumours at a distance producing marked symptoms of dyspituitarism.

The cases of group 4 may, as a rule, be distinguished from the others by the presence of papilloedema, which is rare in sellar or supra-sellar growths. It must be remembered that adiposity and deformation of the sella may result from internal hydrocephalus, such as may be caused, for instance, by a cerebellar tumour. In the case of the first three groups the differential diagnosis is very difficult.

True pituitary adenomas are confined to adults, with maximum incidence in the fourth decade. They may be divided into chromophobe and chromophil adenomas, cystic adenomas and adeno-carcinomas. All varieties originate within the pituitary fossa and cause deformation of the sella, which is apparent in the *x*-ray plate. This is the type of case which is best relieved by the transphenoidal operation, the object being a decompression by removal of the sellar floor and incision of the dural capsule of the tumour. This should be followed up by radio-therapy. The tumours of the cranio-pharyngeal pouch, being of congenital origin, often manifest their presence in the first two decades. Frequently, on the other hand, they do not give rise to symptoms until later on in life. These tumours are, as a rule, primarily supra-sellar, and the *x*-ray picture, therefore, may show no deformity. Occasionally, however, they may arise from epithelial rests within the sella turcica. They frequently degenerate and readily undergo calcification. This is an important point, since the shadow thus produced on the *x*-ray plate—usually supra-sellar—affords evidence not only of the exact situation of the tumour, but also of its probable nature. In this case the ideal approach is by the transfrontal route, which permits complete removal of the growth in a suitable case. These tumours are usually cystic, containing clear fluid. Puncture of the cyst is of little value, since it tends to refill rapidly. The walls must be dissected away.

Full case reports are given in illustration of these points together with *x*-ray photographs and charts of the visual fields, and statistics are presented to show the operative mortality and the end results obtained by the author in the different types of tumour.

C. P. S.

- [26] The influence of the internal secretions on the nervous system.—SIR E. SHARPEY SCHAFER. *Jour. of Ment. Sci.*, 1922, lxxiii, 347.

DEALING with the general question of the action of the internal secretions, the author points out that their influence is dependent upon definite chemical substances, some of which have already been synthesised in the chemical laboratory, which resemble drugs such as the alkaloids, in that while some are exciting in relation to certain effects, others are inhibiting: consequently, using the term 'autocoid' generically to include all, he gives the name 'hormone' to those substances which excite and the name 'chalone' to those which inhibit. Both hormones and chalones exist in any composite autocoid produced in an organ of internal secretion: thus the ovary supplies a hormone which stimulates the development of the secondary female characteristics and also a chalone which inhibits the appearance of those regarded as male in significance.

Limiting himself to those secretions which are known to exert a direct effect on the nervous system, he proceeds to the detailed consideration of the influence of the secretions derived from the generative organs and the thyroid gland, the parathyroid function also being touched on briefly. The paper contains a wealth of chemical and experimental physiological detail and summarizes concisely the present-day state of actual knowledge of the subject-matter concerned.

T. B.

- [27] Some chemical influences in regard to the endocrine glands and the central nervous system.—JONATHAN C. MEAKINS. *Jour. of Ment. Sci.*, 1922, lxxiii, 367.

STATING the fact that the general correlation of the activities of the animal organism is effected partly through the nervous system and partly by the distribution of chemical agents by means of the blood-stream, the author proceeds to consider the physiological action of the two definitely isolated substances, 'thyroxin' from the extract of the thyroid gland, and 'epinephrine' from that of the suprarenal body. Experimental evidence is adduced to show that whereas the influence of the first is the main factor in determining the rate of the general metabolic processes of the body, an increase of the latter in the circulating blood-stream is also followed by an increase in the basal metabolic rate due to an increased combustion of carbohydrate dependent upon a rise in the percentage of blood sugar. Attention is then directed to the importance to the organism of the correct balance of oxygen and carbon dioxide in the blood-stream. The results of experimental or pathological variations in the direction of an increase or deficiency of either, showing that profound and far-reaching disturbances arise, are given, and it is indicated that the withdrawal of either oxygen or carbon dioxide from the tissues may lead to very serious effects on both the central nervous system and certain of the ductless glands.

Passing, then, from the normally present chemical agents, the author considers the possibilities of the formation, under pathological conditions, of substances which, like nicotine when intravenously injected, may bring

about a disturbance of the control of the nervous system and of the endocrine glands. He recounts the experimental work done in the attempt to establish the presence of histamine, one of the most easily detectable end-products of the putrefactive digestion of proteins, in the intestinal canal. The attempt was successful, but considering the extremely small amount of the substance shown to be present and the fact that considerable quantities had to be experimentally introduced into the bowel to produce symptoms, it was not considered justifiable to draw the conclusion that histamine, if present in the human gut in the quantities which had been demonstrated, would exert any appreciable effect on the nervous or other systems.

The question of foodstuffs and their synthetisation into living tissues is then briefly touched upon, the interest centring on the fact that not only are such materials as oxygen, water, inorganic salts, carbohydrate, fat, and protein necessary to supply an animal organism with a sufficiency of nitrogen, carbon, and calories to replace its daily waste, but it is further necessary to supply an irreducible minimum of specified atomic groupings or complexes of nitrogen, carbon, hydrogen and so forth, which are not synthetisable by animal tissues. The author quotes in this connection from Brailsford: "It is highly probable that many of the raw materials from which the various internal secretions are synthetised are dietary constituents of this essential type."

The paper ends with reference to the great advance which has been made in recent years in the study of the endocrine organs, but with a warning that it is necessary to follow the path of strict scientific investigation and to avoid being drawn aside by the "mirage of theory, which has arisen, based on insufficient and oft-times negligible fact."

T. B.

[28] New evidence for sympathetic control of some internal secretions.—

WALTER B. CANNON. *Amer. Jour. Psychiat.*, 1922, ii, 15.

It is pointed out that emotional phenomena are both physiological and psychological, but the field of emotional experiences lies in psychobiology. McDougall's conception of three stages in an emotional experience is accepted, viz., the subjective state, the group of bodily changes, and the instinctive behaviour. Mention is made of the facts we possess of the relation of the endocrine glands to visceral changes characteristic of the major emotions, and Cannon considers evidence for sympathetic control of these glands. With regard to the adrenal medulla, previous experiments are quoted, which Stewart and Rogoff have somewhat adversely criticized, but it is said that from recent work we are justified in concluding that secretion of adrenin is evoked by asphyxia, by reflex stimulation, and by emotional excitement in an amount capable of influencing the viscera, just as they are influenced by the sympathetic nerve impulse. Evidence, too, is given to demonstrate that sympathetic stimulation evokes from the liver not only a discharge of sugar, but also a discharge of some elaborated unknown substance which has both cardio-accelerator and pressor effects. Stimulation of the cervical sympathetic trunk induces an increase of the rate of the denervated heart, which

does not occur if the thyroid gland has previously been excised on the stimulated side. Afferent stimulation of the sciatic or brachial nerve, under a degree of anaesthesia which permits reflex discharge of sympathetic impulses, has the same effect. The only additional element is a prompt primary acceleration of the heart from reflex adrenal discharge, an effect which is continued by the more slowly developing thyroid influence. Asphyxia evokes the same results, but with excision of the thyroid apparatus, sensory stimulation and asphyxia induces only the increased rate due to adrenin. In a certain percentage of cases many of the phenomena of hyperthyroidism have been produced. We have, therefore, ample evidence that adrenal, hepatic, and thyroid secretions are all subject to sympathetic impulses, i.e., to the activity of that part of the nervous system which is roused in great excitement. Rapport and Cannon have located the reflex centre for adrenal secretion in the upper edge of the fourth ventricle, close behind the corpora quadrigemina. That the nervous mechanisms for emotional reaction are found in the archaic part of the nervous system, which is the common possession of all vertebrates, is possibly why the superficial expression of emotions is so similar in widely different animals. We still lack proper tests for adrenal and thyroid secretion in the natural state of the human body, but there is some indirect evidence of their action. We may soon have such tests, and shall then know better the total expression of an emotional storm. The peculiar features that distinguish one emotion from another and the typical modes of expression of the various emotional states may be accounted for, perhaps, in the nervous *pattern* that lies ingrained in the archaic part of the nervous system.

C. S. R.

[29] Endocrine imbalance and mental deficiency—H. W. POTTER. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 331.

THE association of endocrinopathies and mental defect is not new. Seguin referred to the pineal and pituitary glands in his original treatise on idioey. Mental defect as a part of athyrosis has long been recognised. It has been established that bony growth, hair distribution, deposition of subcutaneous fat, sexual development, psychological attributes and metamorphosis may be influenced by one or more of the glands of internal secretion. Inasmuch as this is true, the bearing which the ductless glands have upon the amount of intellectual endowment should deserve careful investigation.

With this purpose in view, 849 cases at Letchworth village were examined from an endocrinological standpoint. Of this number, 314 or 37 per cent. showed evidence of some type of endocrinopathy. The average chronological age of this group was fifteen years, the intellectual age was six and five-twelfths, and the percentage of normal intelligence was forty-three. It was possible to classify these cases according to the characteristics shown, and divide them into eleven different groups. Each of these showed a uniform appearance of a certain combination of findings which have previously been observed in conjunction with known disorders of the endocrine glands, and hence they were termed accordingly.

The cases showed evidence of a pathological condition, chiefly of three glands, viz., in order of frequency, the pituitary, the thymus, and the thyroid.

One hundred and sixty cases showed evidence of a disturbed pituitary function. In two-fifths of these the dysfunction was primary. In the remaining three-fifths there was a hyperactivity of the pituitary, probably as a compensatory reaction to an initial defect in one or more of the other glands of internal secretion. One hundred and thirty-three cases were of the status lymphaticus type. One-half of these showed no evidence of a defect elsewhere in the endocrine system, two-fifths showed signs of a pituitary over-activity, and one-tenth were accompanied by a condition of hypothyroidism. Ninety-nine cases had characteristics of a thyroid dysfunction. All but one-twelfth of these seemed to have a condition indicating an under-activity of the thyroid, half of which were accompanied by a status lymphaticus or had symptoms pointing to a compensatory pituitary over-activity.

In only eleven cases did there seem to be a suprarenal complex present. In all of these the fault seemed to be in a reduction of function, involving the cortex as well as the medulla. It is interesting to note that there was evidence of pituitary over-activity, probably of the nature of a compensation, in each of these cases.

R. G. GORDON.

[30] Psychical anorexia and the thyroid gland (Anorexie mentale et corps thyroïde).—LEOPOLD LÉVI. *L'Encéphale*, 1922, xvii, 507.

THREE cases are recorded of extreme anorexia associated with definite mental symptoms and also with indications of hypofunction of the thyroid gland. In one instance a girl of eighteen, a little under 5 feet in height, weighed only 18 kilograms, i.e., about 2 st. 12 lbs. Her mental condition was one of hysteria, and she resorted to the usual deception to prevent herself from taking nourishment. Psychotherapy carried out for six months had proved useless. Treated with thyroid extract, 48 doses more than doubled her weight. The other cases are equally impressive. The author sketches a somewhat speculative theory of the mechanism of hunger, and explains the phenomena in his cases in the following way: hypothyroidism initiates a loss of appetite, on which is grafted a mental state which in its turn renders the anorexia more profound and persistent. The vicious circle is still more complete if influence of the psychical disorder on internal secretion is admitted.

S. A. K. W.

Psychopathology.

PSYCHOLOGY.

[31] The psychology of inspiration.—T. SHARPER KNOWLSON. *Psycho-analytic Review*, 1922, ix, 440.

THE theory is put forward that an inspiration is the normal but highly fortunate expression of the law which, in its unfortunate and abnormal forms, issues in a complex. This latter is defined as "a clot of emotionalized thought

in the unconscious." Both the complex and the inspiration are *syntheses*—the one being extremely unhappy, and the other extremely fortunate, being a combination of mutually attractive ideas, which thus set up a new unity. One cannot help noticing the presence of *intensity* in both. An inspiration is marked by the same emotionalism as the complex during and after its advent. The complex exercises its functions through *symbolism*, and the inspiration through analogy. This functioning would appear, in both cases, to be practically identical. The discoveries of genius are due to associative action working intensively on the higher plane. In an individual with a complex the associative principle has been at work, but it has ended in dissociation, so that we may arrive at the conclusion that the formation of a complex is a failure in association, just as a stroke of genius is a brilliant success. A final argument is given that men of talent and genius have always been averse to repression of any kind.

C. S. R.

- [32] Laughter, a glory in sanity.—RANSOM CARPENTER. *Amer. Jour. Psychol.*, 1922, xxxiii, 419.

It is thought that previous explanations of laughter have been too limited in scope, and the writer places on view a mental mechanism which he thinks has eluded other inquirers. He states that "laughter expresses an emotion due to a sudden flooding into consciousness of the subconsciously abiding pleasure in the power of judgment, occasioned by the swift overthrow of presented propositions that tend but fail to delude the judgment." Possessing reason is good cause for continuous elation, but our realization of it is glossed over with practical habit. Let a pitfall of absurdity appear in the pathway of thought, so that the mind at the same moment sees when it might have slipped, yet walks erect: then the sense of sanity swells abruptly into sharp emotion that is voiced in laughter. To be comic, a proposition must be (1) perceived as false, and (2) perceived as deceptive, but actually to excite laughter it must generally also (3) be suddenly presented, and (4) have a free field in which its effect is not submerged by stronger emotions. An idea is most comic when all these factors are most favourable. We smile at the aspect of a child wearing his father's hat because the child's pretence offers to our mind the obviously false proposition, 'This hat might make you think me a man,' and there is just enough plausibility in the idea for the idea of rejecting it to remind us faintly that we are sane. A comic fall is one that presents a delusive aspect of catastrophe which we instantly recognize as unreal, relishing the recognition. A child's laughter at the antics of a playful kitten is aroused by the fact that the capers repeatedly suggest that they are the same as those of a real person, which the baby knows perfectly well is not true. If the impersonation had at any point become convincing there would be no laughter, but perhaps fear. The pleasure of play resides in our continuous perception of its unreality. Consider the comic element in a man snoring in church. The incongruous snore abruptly compels rejection of the idea that it is a solemn place where every one is attentive and quiet as merely plausible, at the same time offering the counter-suggestion,

'This man owes no reverence,' which the mind as promptly dismisses because the act is unintended and unimportant. Thus, the ego's triumph lies partly in detecting the flaw in the church's veil of solemnity and partly in perceiving the inconsequence of the defect. In jokes each of these elements can be dissected out and placed in the form of a plausible fallacy, contributing by its downfall to the glow of reason's satisfaction.

C. H.

- [33] A contribution to the study of artistic preference.—J. VARENDONCK. *Internat. Jour. of Psychoanalysis*, 1922, iii, 409.

THIS study is based on the favourite songs of a healthy couple whose married life has been a succession of quarrels and reconciliations without any serious grievances against each other. Each possessed the ambivalent feelings of love and hate for the other, hate being the more conscious of the two. The songs they enjoyed were those which rendered it possible for their second selves to enjoy a mental play in which their secret wishes were represented and realized. The writer found that there was an absence of symbolization in these songs where there was successful repression, but where repression was impossible symbolization was present.

Nine favourite songs of the couple are given and discussed.

C. W. FORSYTH.

- [34] Dreams and telepathy.—SIGM. FREUD. *Internat. Jour. of Psychoanalysis*, 1922, iii, 283.

FREUD holds that there is little or no connection between dreams and telepathy, and that even if the existence of telepathic dreams were established there would be no need to alter in any way our conception of dreams. Two telepathic dreams are cited. An unconscious chain of thought underlies these dreams, the telepathic messages being connected with emotions belonging to the sphere of the Oedipus complex. By far the greater number of all telepathic presentiments relate to death or to the possibility of death. It can be shown on analysis that these forebodings are the result of particularly strong death-wishes in the unconscious of the individual against the nearest relations, which have been long repressed. The writer, both in dreams and in waking life, has been aware of presentiments of distant events. As none of these 'warnings' has been fulfilled, they are to be regarded as purely subjective anticipations. Analytic investigations of telepathic phenomena are useful in that they render their puzzling characteristics more intelligible to us.

Freud does not deny the possibility of telepathy. He ends up: "I have no opinion. I know nothing about it."

C. W. FORSYTH.

PSYCHOSES.

- [35] Studies of schizophrenic reactions.—G. W. HALL and C. A. NEYMANN. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 433.

THE authors subjected twenty-five cases to the fullest investigation from the clinical, chemical-metabolic and psychologic-analytical standpoints. They

found that twelve cases fell into a group which showed evidences of toxæmia, seven into a group showing evidences of endocrine disturbances, and five showing psychogenic disturbances on analysis. One case could not be classified. Four cases are described in detail as examples.

R. G. GORDON.

- [36] The mental health of 463 children from dementia præcox stock.—
M. M. CANAVAN. *Mental Hygiene*, 1923, vii, 137.

THE principal results of this investigation on 1,000 patients with the single diagnosis of dementia præcox, taken alphabetically from the Boston Psychopathic Hospital discharge cards, may thus be summarized: Nine hundred and twenty-five were of marriageable age. Of these, only 275 were married, from whom issued 463 living children, of whom 381 finally were studied. Of the 381 children, eighty-six deviated from the normal, either mentally, physically, or socially. Of the eighty-six deviators the mother had been the patient in seventy-four cases, the father in twelve. Of the 295 normal children, patients were the mothers in 250 of the offspring, the father in forty-five. The deviators consist of five dementia præcox patients, four feeble-minded, twelve backward, twelve nervous, seventeen physically diseased, and thirty-six cases of conduct disorder. The final conclusion remains *in statu quo*, since the 295 normals may show symptoms later, as 79 per cent. were under sixteen, but no symptoms had appeared up to date.

H. M. J.

- [37] The genetic origin of dementia præcox.—SIR F. W. MOTT. *Jour. of Ment. Sci.*, 1922, lxxviii, 333.

THIS is a most important and instructive paper containing the further investigations carried out by Sir Frederick Mott on the broad lines indicated in the title.

The author holds that, underlying the manifestation of symptoms in the great group of psychoses with no hitherto assignable neuropathic basis, there is a genetic inadequacy affecting the totality of the cellular constituents of the organism. This is manifested generally by the failure of such patients to withstand or resist such stresses as microbial invasion, etc., but for various considerations, dealt with in the paper, it is made clear that a deficiency of intrinsic energy as is posited would become overt chiefly in the disturbance of function appertaining to the higher cortical neuronic structures and to the reproductive organs.

The author considers that the term 'primary dementia' applied to conditions arising in the pre-adolescent period, adolescence, and post-adolescence, is a better conception than that of 'dementia præcox,' and he indicates that symptoms may be associated with suspension of function, in which case recovery is possible, or with actual suppression, when the terminal dementia is inevitable, and after which the most marked pathological changes are to be demonstrated post-mortem.

The attitudes of the two schools of thought, the psychogenic and the physiogenic, to the problem of the causation of dementia præcox are con-

trusted and, with the statement that "The physiogenic theory presupposes an inherent germinal narrow physiological margin of functioning capacity of the brain, and that stresses . . . physiological, psychological, and pathological, reveal, excite or accelerate a genetic inadequacy causing a disintegration of the psychic unity," the various forms of stress are dealt with. These include such conceptions as the stress of adolescence, of pregnancy, of masturbation, etc., from the physiological point of view, of continued anxiety or emotional excitement as psychological factors, and of endocrine disturbance, microbial invasion, etc., as pathological causative events. With regard to the bacterial infections, Sir Frederick definitely states his conviction that they cannot be regarded *per se* as producing the mental disorders.

Complete pathological findings in cases of congenital imbecility and dementia praecox are described, and interesting and fundamental considerations concerning the probable functions of the supra- and infra-granular layers of the cortex cerebri are detailed. The mnemonic theory of Richard Semon is touched upon in connection with the development of sex characters, and the paper ends with a series of formulated conclusions.

T. B.

[38] **Alcoholic psychoses before and after prohibition.**—HORATIO M. POLLOCK. *Mental Hygiene*, 1922, vi, 815.

THE results of the author's investigations are as follows :

1. Marked reduction in the prevalence of alcoholic psychoses throughout the United States has taken place since 1910. This is due partly to restrictions on the liquor traffic and partly to changes in the habits of the people.

2. The lowest rate of first admissions with alcoholic psychoses occurred in 1920 : a reaction occurred in 1921.

3. The rate of alcoholic first admissions is closely correlated with the *per capita* consumption of liquors.

4. The reduction in the rate of alcoholic psychoses has been relatively greater among women than among men.

5. Admissions with alcoholic psychoses come principally from urban districts.

H. M. J.

[39] **Memory defect of Korsakoff type, observed in multiple neuritis following toxæmia of pregnancy.**—F. A. ELY. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 115.

AFTER discussing toxic neuritis and its mental accompaniments at some length, the author describes four cases and concludes that :

1. Toxic multiple neuritis is a frequent sequel to hyperemesis gravidarum.

2. Multiple neuritis may develop during gestation or in the puerperium without any dependable evidence of underlying infection.

3. A mild psychosis of the Korsakoff type is very prone to occur in this type of multiple neuritis.

4. Therapeutic abortion is perhaps too long deferred in many cases of hyperemesis, and is the best remedial measure and the most sure means of preventing multiple neuritis.

5. The Korsakoff psychosis was recognized as a very common accompaniment of multiple neuritis following hyperemesis gravidarum long before Korsakoff affixed his name to the same syndrome, which he had observed in alcoholic neuritis.

R. G. GORDON.

40. The simple reaction in psychosis.—F. L. WELLS and C. M. KELLEY.
Amer. Jour. Psychiat., 1922, ii, 53.

A SERIES of experiments were made in light and sound reactions with thirty-seven psychotic cases. The results accord with previous work in that the reaction times were generally lengthened. Individual differences were increased save in the schizophrenic group. The manic-depressive group alone showed a normally small amount of fluctuation of attention to the reaction process. The dementia-præcox group had a smaller sound-light ratio, the general paralytic group a larger sound-light ratio than the normal, to which the manic-depressive group closely approximated. In general, while normal performances in these functions were to be found individually under any diagnosis, markedly abnormal performances were more characteristic of malign conditions.

C. S. R.

41. Transference and some of its problems in psychoses.—MARY O'MALLEY.
Psychoanalytic Review, 1923, x, 1.

IN large institutions for the treatment of the neuroses and psychoses the transference is a vital problem, and even when an unfavourable prognosis is recognized, a positive transfer may be used to prevent patients from deteriorating. Where recovery is probable, the success of all other measures towards readaptation depends upon the affective transfer. Withdrawal from the demands of reality to the infantile narcissistic level with fixation constitutes malignancy. In general, it is maintained that a prognosis is favourable or unfavourable in proportion as the possibility of transfer is greater or less. The narcissistic individual is incapable of making a transference, as all of his love interests are self-satisfied. The elementary notion upon which transference is based is ambivalent and may take the form of love or hate, or the two forms may alternate, and the destiny of the neurotic depends much more than that of the normal individual upon its nature. The establishment of psychological *rapport* is the first step to be taken by a physician, whether the pathological condition of the patient be somatic or psychic. The essential bisexuality in the characterological make-up must not be lost sight of: it permits the patient to form an affective attachment to persons of either sex. In psychotherapy it is only after the transference is securely established that the analyst is able to release the patient's psychological content from its fixation in the unconscious and to deal with this content in a manner that will enable the patient to make a readaptation to life. Especially in an institution there is opportunity to observe the favourable effects of the transfer, but it tends to be unstable, because the physician is often obliged to be custodian as well as adviser. A dissolution of the transference should occur if there is to be complete recovery, but a positive effect is often

better retained after discharge when the psychosis has been severe. In the extroverted types the love-object is not a constant one and the ambivalent tendencies are well seen. Much discussion has taken place as to the value of psychotherapy in such types, especially in the manic-depressive group, but successful results have been claimed. In the excited stage the patients are too egotistic and self-satisfied to require a transfer, but in the depressive phase the need is felt and may be gained. Three cases are given in illustration of the above points.

C. S. R.

NEUROSES AND PSYCHONEUROSES.

[42] The psychoneuroses—Problems and lines of investigation.—C. MACFIE CAMPBELL. *Amer. Jour. Psychiat.*, 1923, ii, 367.

THE problem presented by the psychoneurotic patient is neither this nor that symptom, but the inefficiency of the individual in the social situation which he has to meet. One may grant the very important rôle played by emotional conflicts in the individual life, and yet may wish to know why one system rather than another bears the brunt. One may see that the symptom is the representative of repressed factors, and we can refer to it as a symbol, but the question is why that symbol is chosen rather than a variety of other symbols. Those who are working exclusively at the psychological level tend to suggest that the choice of this special symbol is determined very largely at the psychological level, while, as a matter of fact, the key to the development of the special symptom may have to be found at the physiological level. We are not entitled to assume that vomiting, even though utilized for purposes of psychological adaptation, is necessarily determined by its rôle in relation to the complex mechanism of disgust. The main emphasis has not to be laid upon the same factors in all the cases. In some cases the disorder of a somatic system plays an important etiological rôle: in some cases there are definite emotional idiosyncrasies; in some patients special experiences have sensitized the patient in certain directions: in some there has been, even with fair equipment and with no obvious disorder of the simple emotional reactions, a balance impossible to maintain for an indefinite period. In some there are personal traits of a very special nature which cannot be reduced to simpler elements. In the formulation of each case, one must take into account the possibility of a disorder at each of many levels. In working at this large group of patients we still require very much more information as to the rôle played by the simple organic functions, while not neglecting the complicated development of elaborate psychological reactions. The detailed analysis of the special determination of the specific psychological reactions has been carried further than the other lines of investigation, owing to the enthusiasm of the psychoanalytic school. There remains much work to be done in regard to the rôle of the various systems (cardio-vascular, gastro-intestinal, etc.) in the setting of the emotional reactions: and the study of the personality along lines analogous to those suggested by Hoch and Amsden is an important field for further research.

C. S. R.

- [43] A case of pseudo-epilepsia hysterica.—S. HERBERT. *Psychoanalytic Review*, 1923, x, 70.

THE patient was twenty-two years old, and for ten months had had fits at regular intervals, which in their symptomatology were not distinguishable from true epilepsy, though they proved to be entirely curable by psychoanalysis. The first fit commenced three months after demobilization from the army, when he became exhausted from unusual work. One day while walking he was upset by the noise of tramcars, and as he passed under a railway bridge the noise of a train overhead led to his collapse, and he was taken home unconscious. Subsequently there was a special liability to fits when he heard street noises or a band, and more so still on approaching a railway arch or station. While in the army he had had attacks of giddiness, which were often related to fear of his being sent into the fighting line. Previous to enlistment he had assiduously kept away from women for fear of 'weakening' himself, but afterwards he cohabited freely without scruple, as the possibility rendered him careless, and weakness would perhaps be more in his favour. Psychoanalysis showed that his giddiness had one of its roots in fear and another unconscious one connected with lust. In his sixteenth year he remembered feeling hot and giddy when serving ladies in a shop, and with his physical abstinence he had strong sexual phantasies which never left him. Though really shy and timid, he imagined himself a hero and a 'ladies' man,' and showed all the symptoms of intense narcissism. His fits were what Abraham has called "neurotic absences," being the expression of complete sex-absorption and fear of death. After a short time of analysis he became entirely free from fits, and has remained so for more than two and a half years.

C. S. R.

- [44] Tobacco and the individual.—A. A. BRILL. *Internat. Jour. of Psychoanalysis*, 1922, iii, 430.

THERE are two forms of smoking, one the normally indulged habit, which gives the individual no particular conflict, and the other a part of one's neurotic symptoms. The neurotic incorporates the tobacco habit into his neurosis and uses it as an expression for his ceremonials or any other psychoneurotic mechanisms. Neurotic smoking represents a regression to infantile autoerotism, and judging by the nature of its activity there is no doubt that its infantile root is thumbsucking. It would seem, too, that smoking in general, as well as psychoneurotic smoking, is a regression to autoerotism. Smoking is a mode of expression evinced by almost all modern and primitive men. It is the expression of an aggressive libido which the individual attempts to adjust. Woman is gradually taking to tobacco, as the present-day social and economic conditions hamper her more and more in the exercise of her maternal functions and force her into activities which are essentially unfeminine. In the normal individual smoking is an excellent outlet; in the neurotic it is woven into conflicts. The writer has never seen a single neurosis or psychosis which could be definitely attributed in any way to tobacco. He would enlarge the famous quotation to: "Who

loves not tobacco, wine, women and song, he is a fool the whole day long."

Case histories are given which exemplify some of these points.

C. W. FORSYTH.

- [45] The significance of stepping over.—GÉZA RÓHEIM. *Internat. Jour. of Psychoanalysis*, 1922, iii, 320.

It can be demonstrated from folk-lore, of which many examples are cited, that stepping over a threshold, or over a besom, or stepping through a window, or being passed through a window, or passing between the legs of a woman, signifies coitus. In Mecklenburg there is a saying that a person who is still growing must not step in or out through a window, unless he returns the same way. When a child is passed through or passes through a window it is, symbolically speaking, passed back into the womb and therefore cannot grow. The house represents a woman, the window the vagina.

The case reported by Dr. Sokolnicka in the same journal is discussed in the light of the above interpretations. The outbreak of the phobia was occasioned by the statement of the nurse: "A child must not be lifted through a window because then it will not grow any more." We know from analysis that a fear that an object will not grow is a castration fear: growing thus representing erection. Here the boy's fear of castration did not refer to sexuality in general, but first and foremost to coitus with the mother. Therefore being lifted through a window does not in this instance signify any indifferent sexual intercourse, but the incestuous one, in which he would actually pass through the very genital organ which he had already come through at birth.

C. W. FORSYTH.

PSYCHOPATHOLOGY.

- [46] The complications and mental sequelæ of epidemic encephalitis; bradyphrenia (Études sur les complications et les sequelles mentales de l'encéphalite épidémique; la bradyphrénie).—NAVILLE. *L'Encéphale*, 1923, xvii, 423.

In spite of the frequency of initial mental disorder, epidemic encephalitis is very rarely followed by definitive psychoses (manic-depressive, acute confusional insanity, Korsakow's syndrome, etc.). What would appear to be the most common, possibly even a pathognomonic, disturbance of mentality in the disease is constituted by a lethargic or psychomotor torpor, often accompanied by impairment of psychomotor automatisms analogous to that of motor automatisms. Judgment and deliberation are intact, but executive power is wanting. The ordinary motor defects consecutive to the disease may not be observable, yet the patient may be completely inert and in reality helpless, because of this absence of initiative. The author, however, is inclined to think that if this psychical disorder is at all marked it is accompanied by parkinsonian symptoms. Intellectual and emotional defects are rarities in comparison with this extreme fatigability of initiative, interest, and psychomotor activity. It would appear, in fact, that there is something specific

about this symptom, which is not as a rule found in the psychoses properly so called, in post-infective or post-traumatic mental states, in senile or organic dementias. For it the author proposes the name "bradyphrenia," on the analogy of hebephrenia, presbyophrenia, etc. He believes it will be shown some day to have as definite a basis as the motor phenomena at present occurring with great frequency in post-encephalitic states.

S. A. K. W.

- [47] **The mental disorders of epidemic encephalitis** (Les troubles mentales dans l'encéphalite épidémique).—TRUELLE and PETIT. *L'Encéphale*, 1922, xvii, 582.

THE psychical symptomatology of epidemic encephalitis is as variable and polymorphous as is the somatic. Among the psychopathic syndromes may be enumerated the lethargic, the confusional, the depressive, the agitated or manic, and the catatonic varieties. Again, a distinction may be drawn between acute, subacute, chronic, and "fruste" types.

The confusional form of psychical disturbance is that common to any kind of toxi-infective invasion of the cerebrum: psychopathic manifestations otherwise are a function of individual predisposition revealed, but not originated, by the disease: perhaps, therefore, the most legitimate and specific mental sequel is a *pseudo-dementia* taking an inhibitory form, a sort of psychical torpor.

S. A. K. W.

- [48] **A peculiar transformation of personality due to encephalitis lethargica.**—DONALD MCNEIL. *Amer. Jour. Psychol.*, 1923, xxxiv, 13.

THE case, that of a man aged thirty-five, is reported because it seems an interesting phenomenon to trace a personality-transformation from a specific disease of the grey matter of the brain. The treatment consisted in a low protein diet with intramuscular injections of tethelin, a drug supposed to contain the active principles of the anterior lobe of the pituitary, though it is noted that the improvement may have been due to the natural healing process of time. Following upon the encephalitis a condition of dystrophia adiposo-genitalis supervened. The illness did not leave the patient's intelligence seriously impaired, but many personality changes were noted. There was increase in his motor activity and he became very loquacious, self-assertive and extravagant (all markedly opposed to his normal self), so that he began to be disliked, especially in that he lacked tact and showed an undue inclination to talk about his own ailments. His previous attributes of conscientiousness, truthfulness and discretion were no longer present, and he became very untrustworthy in his work. A former moodiness gave way to taking things lightly, with no disposition to brood over difficulties. A marked egotism and forwardness as well as distrust of others were manifested, while a certain lack of restraint and impairment of judgment were combined with an abnormal proclivity for the opposite sex, though he became functionally impotent. The author considers that perhaps all of the character-trait transformations may be reduced to the factor of paralysis of inhibitions. Control demands, for its perfect exercise, the perfect functioning of a very elaborate cerebral

mechanism. It is this that has been injured by the encephalitis, and because of its injury the peculiar transformation of character has taken place. Such an injury may happen in other ways, and frequently appears as a transitory disturbance in alcoholism and epilepsy. With encephalitis the injury is more permanent, and it is not likely that this patient's character will ever return again to what it was.

C. H.

- [49] **Delirium acutum and primary sinus thrombosis.**—K. H. BOUMAN and B. BROUWER. *Jour. Nerv. Ment. Dis.*, 1922, lv, 273.

A FULL account is given of two cases of acute delirium in the course of dementia præcox, in which a primary sinus thrombosis with hæmorrhages in the cortex was found at autopsy. There was considerable degeneration of nerve cells, and other organs showed signs of an acute infective process of uncertain origin.

Primary sinus thrombosis may accompany all sorts of diseases, but is usually due to infections, and often results in mental symptoms: the authors, however, do not think the thrombosis caused delirium in the cases examined. They consider both were manifestations of the infection going on elsewhere in the body, and that the effect of the thrombosis was merely to hasten death. Many observers think delirium is due to encephalitis, but the authors point out the absence of true signs of inflammation in many cases and prefer to regard the degeneration of nerve cells as due to metabolic defects.

They noticed that the frontal areas suffered most and the large cells were more affected than the small cells. They attribute this to the fact that the frontal areas are phylogenetically younger and, therefore, less resistant than other parts of the brain. With regard to the special affection of the large cells, this is found in all degenerative diseases of the nervous system and in all parts of the brain and spinal cord, and is supposed to be due to the fact that the metabolism of large cells is carried out with more difficulty than that of small cells.

R. G. GORDON.

- [50] **Lesions of the corpus striatum in the catatonic form of dementia præcox** (Lésions du corps strié, 'plaques cyto-graisseuses,' et altérations vasculaires, dans trois cas de démence précoce hétérophrénocatatonique).—LAIGNEL-LAVASTINE, C. TRETIAKOFF and N. JORGULESCO. *L'Encéphale*, 1922, xvii, 151.

THIS important paper is based on the pathological anatomy of three cases of dementia præcox, which presented the typical symptom-complex with, in each case, a terminal period of severe catatonia. The patients died at the ages of twenty-six, forty-seven and fifty-two years. The brains of the two older cases showed large multiple cavities, one of which in Case II, spread down from the optic thalamus to the medulla. From the appearance of these cavities and the absence of bacilli in their walls, the authors formed the opinion that they were neither artefacts nor due to decomposition, but had developed during life. Apart from these cavities, three principal types of

lesion were found in each of the cases. These were not confined to the corpus striatum, although they occurred in the caudate nucleus with the greatest constancy and frequency. These were (1) 'Plaques cyto-graisseuses,' which are described as small areas of lipoid accumulation, from 100 to 150 μ in diameter, usually grouped round nerve cells, but sometimes apart from them. The lipoids in these formations were all of the nature of fatty acids; some cholesterin crystals were also found, but no neutral fats could be demonstrated. Marchi's method only gave a pale grey staining to the lipoids, and this disappeared when the sections were passed through alcohol. They were, however, brilliantly coloured with Sudan, Nile blue and other special methods. They occurred in the caudate nucleus, the frontal cortex, and the hippocampus in every case, and in the putamen and other regions of the cortex less constantly. In only one case did they occur in the globus pallidus and cerebellum, and they were never found in the midbrain, pons or medulla. (2) An area of degeneration comprising the head of the caudate nucleus, the anterior third of the lenticular nucleus, and the tissues in the immediate vicinity. This degeneration affected all the fibres going from the head of the caudate nucleus, and those passing through the anterior part of the globus pallidus, and the anterior limb of the internal capsule. In one case the knee of the internal capsule, the genu of the corpus callosum, the anterior commissure and, for a short distance only, the anterior pillars of the fornix were also demyelinated. (3) A fatty degeneration of the endothelial cells of some of the smallest vessels and capillaries of the brain. This was unassociated with any atheromatous or other change in the vessel walls. It will be noted that the lesions of types (1) and (3) would not have been observed by the ordinary methods of staining. The lesions of type (2) also were such that, unless they were unusually gross, they would have readily escaped notice in sections stained by Weigert's method. The authors consider that the special incidence of the lesion in the caudate nucleus may have been associated in some way with the symptom of catatonia.

J. G. GREENFIELD.

[51] The syndrome of Lilliputian hallucinations.—R. LEROY. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 325.

ATTENTION is drawn to the occurrence of hallucinations of minute figures of people, animals and objects. All this little world, clothed generally in bright colours, walks, runs, plays and works, in relief and perspective. These micropsic visions give an impression of real life. The condition, however, is not associated with micropsia. Such hallucinations are accompanied by a pleasurable tone. As a rule there are no accompanying auditory hallucinations, but, if there are, the small people speak with a Lilliputian voice. The hallucinations occur in toxic deliria apart from definite psychoses, and may accompany or follow ordinary toxic hallucinations. They are most common in alcoholism, but may occur in all sorts of toxæmias and psychoses, though opium does not seem to cause them. Various illustrative cases are cited, and the author points out that the infrequency of mention of these hallucinations in medical literature is counter-balanced by their frequent mention in fiction.

They seem, then, to be dream-products of the unconscious, usually associated with pleasant feeling-tone as amusing and harmless creatures.

R. G. GORDON.

- [52] The mental symptom-complex following cerebral trauma.—E. E. HADLEY.
Jour. Nerv. Ment. Dis., 1922, lvi, 453.

THE previous literature is briefly reviewed and thirteen cases are described in detail. The average clinical picture is that an injury is received which causes complete unconsciousness for some days. Gradually the patient responds more and more to stimuli, but at first attention is hard to secure and harder still to hold. His sensibilities are blunted and he remains somnolent. He is, however, restless and confused, and his speech and behaviour may be found to represent certain activities preceding the trauma. He is intensely irritable and resents interference. He shows great sensitiveness to all forms of sensation and tries to get away from them by withdrawing into himself, but if they persist they may cause an emotional outburst. He is emotionally unstable and asocial and inclined to be resentful of his treatment. When he is at his best he thinks he can quite well go back to work, if depressed he despairs of doing anything. Small quantities of alcohol make him extremely drunk. He gradually improves and regains his memory and mental power, but he is apt to be less able to correlate ideas, and his concentration is poor. He finally may adjust to an occupation which is not too strenuous, but always shows an alteration in capabilities and personality. Accompanying neurological symptoms may modify this course and may lead to permanent invalidism. Previous psychopathic tendencies or inherent trends will colour the clinical picture, and in such cases the trauma can only be held to have precipitated the disease and not to have modified its manifestations. The symptoms described above are to be explained generally on the lines of a gradual restoration of mental correlation and a massive defence-reaction against noxious stimuli.

R. G. GORDON.

- [53] The hereditary transmission of mental diseases (Sur la transmission héréditaire des maladies mentales).—WIMMER. *L'Encéphale*, 1922, xvii, 129.

PROFESSOR WIMMER in the introduction to his paper stresses the valuelessness of older statistics in respect of the hereditary descent of mental disease, and restricts his personal researches to dementia præcox and manic-depressive psychosis. He explains how in Denmark it is often comparatively easy to trace the relations of affected patients and how data concerned with family histories can be collected objectively on a fairly large scale. His investigations have been conducted from the viewpoint of the principles of Mendelianism, a brief account of which precedes a detailed description of his research. The great difficulties in the way of the application of these principles to the human race are fully appreciated.

Dementia præcox.—Two hundred and two families were investigated, comprising 831 healthy offspring (living and dead) and 240 patients. This

gives, roughly, a percentage of 29, but Professor Wimmer points out its erroneous nature and follows the method elaborated by Weinberg, which for various reasons approaches much more closely to Mendelian figures. According to it the percentage is merely 5.2. For the scheme by which this figure is reached the reader should consult the original. The conclusion is that dementia præcox is probably a mental affection of a hereditary nature: in Mendelian terms, recessive and di-hybrid; the heredity is similar, and discontinuous; with parents apparently normal (i.e., normal to outward appearance) it appears in approximately one-sixteenth of their offspring. As a practical observation, the presence of the disease in a family excludes the occurrence of the manic-depressive psychosis.

Manic-depressive psychosis.—Two hundred and twenty-four families were scrutinised, with some 1,183 members, of whom 236 were patients. Here the crude percentage is in the neighbourhood of 25, whereas by Weinberg's method it rises to 32.9. In all probability this condition is a hereditary mental affection, with heredity similar and direct: in Mendelian terms, it is dominant, but complexly so; in the families affected by it dementia præcox is not found.

S. A. K. W.

[54] The biological factors in mental defect.—G. A. AUDEN. *Psyche*, 1923, iii, 240.

IN the consideration of mental defect, confusion has arisen from failure to discriminate between pathological and biological factors. Intelligence and conduct have been used as standards of measurement. The term 'moral imbecile' used in the Mental Deficiency Act is most misleading. In drawing an analogy from chemistry, the author describes conduct as the group-reagent by which mental deficiency is indicated, and intelligence tests as a reagent for a further subdivision.

The use of the term 'herd instinct' seems to exclude the influence of external suggestion; McDougall's term 'group mind' is preferable. Suggestion is the chief agent in the transmission of social virtues and customs. The social organism and mental deficiency are probably controlled by biological factors, the causative factors in the latter being probably phylogenetic. The author quotes Rivers' biological theory of the genesis of morbid mental states. In the evolution of the nervous system, the 'protopathic' sensations possess an affective tone and give a general awareness only, directing primitive organisms in their approach to or retreat from stimulation. 'Epicritic' sensibility allows the nature of the stimulus to be recognised and to have full play. Suppression of the more primitive protopathic sensibility must occur. This suppression is not complete, and a fusion of a portion of the protopathic with the epicritic sensibility occurs. The 'all-or-none' reaction is exhibited by the protopathic response to stimulation, i.e., no gradation in response occurs. The primitive instincts of self-preservation and propagation are intimately associated with protopathic sensibility. Rivers believed that egoistic and self-preserved instincts in the individual are of the protopathic kind, while the epicritic class is associated with the development of gregarious life.

In dealing with the process described by Rivers as 'suppression,' which is compared to the suppression taking place on the sensori-motor and reflex levels, Auden quotes from *Instinct and the Unconscious*, in which work Rivers attempted to prove that every unit forms part of a hierarchy in which it controls lower, and is itself controlled by higher, elements of the hierarchy, the normal mental state being one of equilibrium between protopathic instinctive tendencies and the epicritic forces by which they are controlled. This theory of a two-stage evolution of the nervous system is corroborated by Head's researches on the relations between the optic thalamus and the neopallium: "There is thus a close parallel between the protopathic and epicritic sensibilities of the afferent nerve tracks and the relation of the optic thalamus to the cortex: the attributes peculiar to the former can be said to be related with the protopathic system and the latter with the epicritic system."

The lowest grade of idiot has not advanced beyond the protopathic stage of evolution. The lighter degrees of idiocy and imbecility can be interpreted in degrees of epicritic control. Gregarious or communal life means subordination of individual desires to the interests of the community and is, therefore, inhibitive in character. Thus, according to Rivers, the gregarious instinct is an epicritic characteristic. McDougall has shown that a crowd is more thoughtless, more callous and cruel than an individual. The behaviour of the feeble-minded is likened to this description of crowd psychology. In the former epicritic control is rudimentary, while in the latter it is temporarily suspended. The regressive characteristics of the crowd and of the misdeeds of later childhood are commented on and recognized as being based in repressed experiences. It is suggested that motiveless arson may be a regression to an early stage of man's history, when the making of fire was of such vital importance. In considering instinctive behaviour, the author quotes Golla's example of the nest-making tendencies of the expectant mother who, on the approach of parturition, will tidy up drawers and sort papers, etc. The above theories are confirmed by Whately Smith's experiments on the effect of alcohol on emotivity. Alcohol causes a regression to the all-or-none or protopathic type of reaction.

The wide variations in intelligence and educational capacity can be explained on a biological basis. Remembering that ten generations ago the great majority of persons were totally illiterate, it is not surprising that the mental mechanism involved in the acquisition of reading has not become as uniform in action as that of speech, which is the oldest human special capacity.

In summarising, the author divides mental deficiency into phylogenetic and ontogenetic groups, which may be termed the evolutive and devolutive types. In the evolutive type the child has not evolved to the average mental level demanded by the community, and in the devolutive type accident or disease has produced degenerative changes in the brain. Physical characteristics known as 'stigmata of degeneration' are present in this type.

If the existence of biological factors in the production of mental defect is established, then, to be effective, eugenic measures must be founded on biological principles.

ROBERT M. RIGGALL.

- [55] The cerebrospinal fluid in simple infantile mental debility (Le liquide céphalo-rachidien dans la débilité mentale infantile simple). ROUBINOVITCH, BARUK, and BARIETY. *L'Encéphale*, 1922, xvii, 518.

THE authors investigated the cerebrospinal fluid in 48 cases of mental defect, excluding (1) definite idiots or imbeciles, (2) all cases with neurological complications such as diplegia, hemiplegia, etc., (3) epileptics. In a word, the children were simple *arriérés*. Hyperalbuminosis was present in 41 per cent., lymphocytosis in 16 per cent., and a serologically positive Wassermann reaction in 32 per cent. On the other hand, the reaction was without exception negative in the spinal fluid. The association of increased albumin and of lymphocytosis in not a few cases with a negative Wassermann test is instructive. The general conclusion drawn is that, in a fair number of what appear to be cases of simple retardation without physical signs, an organic element is revealed by lumbar puncture.

S. A. K. W.

- [56] Psychological disturbances in tabes (Contribution à l'étude des troubles psychiques dans le tabes).—URECHIA. *L'Encéphale*, 1922, xvii, 289.

DIFFERENT kinds of mental disorder have been at one time or another found to develop in cases of tabes, but no unanimity has been reached as to their pathogenesis. Supposed to be due either to the presence of the syphilitic toxin, or to a structural cerebral change of syphilitic origin, they have not been sufficiently correlated with pathological investigation of the actual state of the brain in that disease. Alzheimer found changes in several tabetic brains identical with those of general paralysis, but in two cases with confusional symptoms microscopic examination was negative. In a case of tabes with a paranoid psychosis Sioli found slight cellular infiltrations in pia mater, cerebellum, pons and crura, and supposed these to be distinguishable both from paralysis general and cerebral syphilis. Three varieties of lesion were described by Jakob as occurring in tabetic psychoses: (1) patchy lesions, like those of G. P. I.; (2) endarteritis syphilitica of the small vessels; (3) diffuse parenchymatous alterations with or without meningeal infiltrations.

Urechia's case is that of a man of thirty-five, with moderate tabes, and with definite mental symptoms such as depression, refusal of food, visual hallucinations, anxiety, emotional overaction, self-depreciation, etc. Slight parietal thickening of the meninges was found, with corresponding patches of superficial encephalitis; in these limited areas the vessels showed proliferation of the endothelium and adventitia, with some perivascular infiltration. Otherwise, the brain was intact. The author concludes that tabetic psychoses have an organic basis in the existence of some degree of cerebral syphilis. He believes that ethical, moral, and characterological modifications occasionally recorded in tabetics (as in epidemic encephalitis) may similarly be regarded as having for foundation some encephalitic lesion.

S. A. K. W.

- [57] Incidence of insanity amongst the Jews.—JACOB A. GOLDBERG. *Mental Hygiene*, 1922, vi, 598.

FOR years it has been maintained by psychiatrists that the Jews contributed more cases of insanity than any other race. Of late this has been doubted,

and some assert the converse to be true. Lombroso found that the seemingly large percentage among Jews was not so much a matter of race as of intellectual work, for among the Semitic races in general (Arabs, Bedouins) insanity is very rare. In 1909 Siehel, in Germany, found that a higher percentage of Jewish inmates in insane hospitals could only be demonstrated in certain groups of mental disorders. Pilez in Vienna, and Beadles in London, have published studies which indicate a higher percentage among Jews, while Spitzka came to the conclusion that the proportion was no different from other races. It is pointed out that the statistics in some countries are unreliable, because in such parts the Jews have been specially persecuted and undergone marked mental stress. Because the largest number of Jews within modern times congregated in a limited area are to be found in New York City, a statistical study has been made, and it has been found that the percentage of Jewish admissions to the psychopathic wards of Belleville Hospital would not average over 16.5 per cent., which is considerably less than 25.8 per cent., the proportion of Jews in the general population of New York City.

H. M. J.

[58] Anhedonia.—ABRAHAM MYERSON. *Amer. Jour. Psychiat.*, 1922, ii, 87.

THE term is used in the sense of a sort of organic anæsthesia, a dropping out of consciousness of desire and satisfaction. Associated with this and the group of symptoms which develop as a result, the writer draws attention to another factor, a disorganized spread of excitement. In anhedonia, desire to satisfy hunger, thirst, or sex is greatly impaired or disappears. The desire and capacity for sleep are also critically impaired. The central symptom, which is regarded as responsible for many of the others, is the lowness of energy, so that all effort, mental and physical, is painful, and it is surmised that a feeling of sadness is a necessary sequela. Following on all this there frequently arises a restless cogitation, which may take the form of an obsession of unreality akin to the psychasthenic obsession of doubt. The nature of excitement is analyzed, and it is shown that seeking excitement becomes one of the great pleasure-trends of life and that organized excitement in the form of interest is the guiding principle of activity. In anhedonia, excitement of any kind tends to become painful, though preceding this the patient may seek excitement in order to find pleasure, but finding herein displeasure, he becomes seclusive. Competing stimuli make choice difficult, so that doubt and confusion tend to result. Under what circumstances does this symptom-complex tend to appear? (1) After an acute infection, typically influenza. (Myerson here remarks that he is not attempting to differentiate this state from neurasthenia and is, perhaps, merely describing neurasthenia in a different way.) (2) Following surgical operations and pregnancy. (3) In the menopause of women and the involutional period of the male. (4) As a reaction to circumstances, as when purpose is hopelessly blocked. (5) Most characteristically, in the early stages of mental disease, especially manic-depressive insanity and dementia præcox. (6) A recurrent type of mental disease might be described as *idiopathic anhedonia*, where none of the ordinary

causes exist. (7) Finally, there are types of people who are anhedonic by nature.

Theraputies will depend on the relationship of the syndrome to other mental conditions: whether definitely related to some physical or psychical disturbance: on the original temperament of the patient and on the nature of the symptoms presented. The organic condition of the patient must first be treated by drugs, physical therapy and re-education, so that sleep and appetite are restored. Hydrotheraputies and massage with graduated exercises are advocated to bring about energy-feeling, while a resolving of any individual psychological problem should receive attention. Disorganized excitement, when it occurs, must be allayed by quiet, if necessary through bromides and sedatives, and then by the gradual increase of stimulation the patient is trained back to normality.

C. S. R.

[59] A study in constitutional psychopathic inferiority.—JOHN W. VISHNER. *Mental Hygiene*, 1922, vi, 729.

No other psychiatric disease group is the subject of so much difference of opinion. Psychologically, this type presents marked inherent defects in volition and inhibition, together with a lowered threshold for and a disproportionate response to implicit and explicit stimuli. There is, too, a lack of balance in the various hereditary and acquired reaction-patterns. The patients cannot adjust their inadequacies by experience or by compensatory modes of reaction. The condition is characterized by marked egotism, impulsiveness, poor judgment, nonconformity to ethical and social standards, and inability to adjust to or profit by discipline. As they cannot apply themselves for long, they often become misfits, loafers, beggars, paupers, hobos (tramps) or vagabonds. Their poor inhibition makes them prone to the commission of crimes of passion and sensual excess: a large proportion of alcoholics, drug addicts, prostitutes and sexual perverts fall into this group. Over-compensation may render them fanatical reformers, assassins or anarchists. They are continually in conflict with others, and psychotic manifestation frequently results. From their lack of judgment, eccentricities and unsound beliefs are easily adopted. Experience profits them little, if at all: the opinion of society has little effect, and no remorse if felt. Glueck has shown that they furnish a large number of the first admissions to penitentiaries and a large proportion of recidivists. Some statistics are here given of fifty cases. Visner classifies the types as (1) the inadequate-personality type, (2) the hobo, (3) the pathological liar and swindler, (4) the drug addict, and (5) the criminal type. Additional types not illustrated are (6) the chronic alcoholic, and (7) the various types characterized by pathological sexuality. In the differential diagnosis must be considered the constitutional psychopathic state, constitutional inferiority, mental deficiency, psychasthenia, and hysteria. The treatment is very unsatisfactory. It consists, theoretically, in choosing a vocation. In children the outlook is more hopeful. Psychotherapy, re-education and hospitalization are but of little avail.

H. M. J.

- [60] Existing tendencies, recent developments and correlations in the field of psychopathology.—W. R. WHITE. *Jour. Nerv. Ment. Dis.*, 1922, lvi, 1.

THE author points out the growing dissatisfaction of psychiatrists with the static views of the older authorities represented by Kraepelin, though such dynamic conceptions as those of Kempf have not so far replaced the former for pragmatic reasons. He refers to Kretschmer's work on the sensitivity of the individual as an explanation of the development of certain psychoses, and points out that although there is nothing fundamentally new in the work it does constitute a new way of looking at things, which is always advantageous. Much work has been done in classifying character-types and tracing their different manifestations throughout life, and also correlating them with peculiarities of bodily formation and mental disease. New lines of inquiry are being opened up by the study of clinical entities in all their possible bearings, but care has to be taken that philosophical theorising does not take the investigator too far from his patient, so that he loses clinical touch. Signs of various constitutional defects have been found by many observers in dementia praecox, and these frequently throw light on various symptoms otherwise unexplained.

Studies of encephalitis and other infections seem to indicate that Kraepelin's view that different forms of intoxication may be recognised by the symptoms they produce may, after all, have something in it. Certain studies in mental symptoms in diseases of the basal ganglia are opening out new opportunities for a rapprochement between neurologists and psychiatrists. Recent metabolic and psychological work in relation to epilepsy is referred to. The importance of the narcissistic conceptions in psycho-analysis and their relation to the more severe neuroses and psychoses is discussed and mention is made of Ferenczi's so-called 'active therapy,' in which the patient has to forbear from indulgence in any of the symbolic means of satisfaction of unconscious desires while under treatment.

Mention is made of the new fields opened up by the study of neuro-anatomy and neuropathology from biological and physiological points of view instead of purely topographical standpoints, and similarly in psychopathology by the study of man not as an individual but as a unit in a social community. Further, it is necessary to widen our outlook in all directions in view of the general breakdown of all finality in laws of physics and mathematics which has followed the acceptance of relativity.

R. G. GORDON.

- [61] Study of institutional escapes.—CHARLES F. READ and DAVID B. ROTMAN. *Amer. Jour. Psychiat.*, 1922, ii, 75.

ESCAPES from mental hospitals are not generally looked upon as good types of reaction, though occasionally they may represent a healthful protest against confinement. From the Chicago State Hospital, during a twelve-month, 123 patients escaped and were not captured, as well as 308 men who were quite promptly returned. This hospital has 3,500 patients, and is without walls on the outskirts of a large city. An investigation into the fate of

the 123 only furnished information concerning thirty-one. Fourteen had been re-committed; seven had not been heard from; one had died; one had committed suicide; one was an inmate of a reformatory; three were doing very poorly, with an almost complete dependence on relatives; and four seemed to be making a good adjustment. From an analysis of the types of men a composite description of an cloper might be made as follows: A man in the third or fourth decade; most probably a single man or one free from compelling family ties and rather given to alcoholic indulgence. The chances are he would be a subsided case of dementia præcox, a recovered or improved alcoholic, a rebellious parietic, or an improved case of 'individual reaction' type. Only one time out of twenty would he be feeble-minded, and practically never a sexual pervert with criminal tendencies. He may have made prior escapes, but not more than one or two if he is to succeed in remaining out of the institution. The recidivist is quite hopeless. Often he has tasted liberty in the shape of an unsuccessful prior parole. The chances are about four to one that he will be returned to hospital in a few days or weeks, and if he remains out it will be difficult to discover just how he accomplished it, because his relatives are either assisting him or know nothing of his whereabouts.

C. STANFORD READ.

TREATMENT.

- [62] The significance and management of hypochondriacal trends in children.
—*Mental Hygiene*, 1923, vii, 43.

PREVIOUS studies of chronic hypochondriasis in adults among those treated in the psychiatric wards of the Johns Hopkins Hospital are spoken of. It was found in every instance that the symptoms were substitutes for psychobiological material in the form of thwarted ambitions, petty jealousies, romantic disappointments, dissatisfied life, a desire to escape marital or domestic responsibilities, and many another unhappy ingredient of life's experience. Thinking that a childhood study might contribute towards a better understanding of such cases, 623 children were examined. Of these, 167 seemed to be pure cultures of neurotic traits uncontaminated by mental retardation, delinquency, or somatic deficit of any kind. It was found that 13 per cent. of these exhibited a tendency to hypochondriacal complaints, and the symptom pictures were strangely similar to those of the adult types. In the study of these twenty-two cases an intensive investigation of the family problem was made by means of a psychiatric social service, and in all but one it was found that the complaints had been absorbed from a home atmosphere charged with hypochondriacal utterances and fear of disease. Within a period of from one to two months after the first visit to the dispensary eighteen showed a complete elimination of the symptoms through the adoption of a therapeutic régime. Examination revealed groundless somatic complaints with which the child had become infected from various sources. In every case there had been a utilization of the symptoms for personal gratification. In all but four cases a satisfactory adjustment was obtained through a reconstruction of environmental influences, with efforts particularly directed against the focus infection.

H. M. J.

- [63] The etiology and treatment of the so-called functional psychoses.—HENRY A. COTTON. *Amer. Jour. Psychiat.*, 1922, ii, 157.

THE writer at the outset belittles the factors of heredity and psychogenesis in these psychoses and endeavours to produce evidence that they are in reality disorders of the brain and that the mental symptoms are secondary. Any psychogenic factor is regarded as only playing a precipitating rôle. The thesis of this contribution is that the so-called psychoses are due to "a combination of many factors, but the most constant one is the intra-cerebral, bio-chemical cellular disturbance arising from circulating toxins originating in chronic foci of infection, situated anywhere throughout the body, associated probably with secondary disturbance of the endocrine system. Instead of considering the psychosis as a disease entity, it should be considered as a *symptom*, and often a *terminal symptom* of a long continued masked infection, the toxæmia of which acts directly on the brain." Infection of the teeth is regarded as the most constant focus, and the mouth cannot be considered free from infection unless infected tonsils are removed. The various types of streptococci and colon bacilli are found to be chiefly responsible. Infection, however, may spread to other parts of the body, which would account for the fact that no good results sometimes occurred from the elimination of infected teeth and tonsils. Secondary foci of infection of the stomach, duodenum, small intestine, gall bladder, appendix, colon and genito-urinary tract can also arise. Kopeloff's conclusions that gastric infection has no relation to the psychosis is refuted and Rehfuss' opinions are confirmed. Cotton goes further still, and regards as important the possible involvement of mesenteric lymph nodes, the female cervix, the seminal vesicles in the male, and the antrum. Treatment by detoxication is naturally the only course to pursue. All the infection from the above-named sources must be eliminated and, if necessary, autogenous vaccines made from the bacteria isolated in the stomach contents are administered. The banishment of infection from the lower intestinal tract has seemingly not been easy, so that in certain cases colectomy is thought justifiable. Any help from organotherapy up to now has met with little success. As regards results, Cotton claims that his recovery rate during the past four years has averaged 80 per cent., whereas during the previous ten years it was only 37 per cent. The proportion of re-admissions is said not to have increased. The failures are explained upon the ground that the brain had become permanently damaged and no amount of detoxication could have any effect in restoring the mental condition. An interesting discussion follows.

C. S. R.

- [64] Studies in focal infection: Its presence and elimination in the functional psychoses.—NICHOLAS KOPELOFF and CLARENCE CHENEY. *Amer. Jour. Psychiat.*, 1922, ii, 139.

THE number of patients studied were thirty-eight women and twenty-eight men. A very thorough physical and psychological examination was made of each case. All the patients were divided into two groups as nearly identical as possible. All members of one group received operative treatment for foci

of infection in teeth and tonsils, while members of the other group received no such treatment and, consequently, could be regarded as controls. The conclusions of the authors are summarized as follows :—

1. The removal of infected teeth and tonsils from twenty-seven cases showing manic-depressive, dementia-præcox and psychoneurotic reactions has been followed by no more mental benefit than was shown by a comparable group of thirty-three patients from whom such supposed foci of infection were not removed. There were no recoveries or distinct improvements other than those prognosticated irrespective of focal infection.

2. The Rehfuß method of fractional gastric analysis is not to be relied upon as a means for determining gastric infection. The bacteria found in the stomach contents by this method may be derived for the greatest part or entirely from the swallowed saliva.

C. S. R.

Reviews and Notices of Books.

The Mechanism of the Brain and the Function of the Frontal Lobes.

By LEONARDO BIANCHI, Professor of Psychiatry and Neuropathology in the Royal University of Naples. Translated by JAMES H. MACDONALD, M.B., Ch.B., F.R.F.P.S. (Glasg.), MacKintosh Lecturer in Psychological Medicine, Glasgow University, with a Foreword by C. LLOYD MORGAN, LL.D., D.Sc., F.R.S., Emeritus Professor in the University of Bristol. Pp. 348. Illustrated. 1922. Edinburgh: E. and S. Livingstone. 21s. net.

THIS book, written by a psychiatrist who has spent the best part of fifty years in close observation of the structure and functions of the cerebral mechanism, contains an epitome of his life's work with the conclusions to which he has been led in the light of his own researches and the observation of others.

The book opens with a chapter of sixty-seven pages devoted to the evolution of the nervous system, in which are revealed the author's fundamental conceptions of the mental activities. Professor Bianchi is a man of science who is in touch with modern researches in bio-chemistry and physics and seeks in the history of natural evolution a continuous line from the simplest inorganic phenomena to the complex behaviour of nervously integrated animal life and the conscious activities of man, in whom Nature becomes most fully revealed to herself through the intermediary of the nervous system, particularly the frontal lobes. These structures, he believes, are the seat of the highest mental functions, and elaborate the intellectual and emotional products of the rest of the brain. In support of his contention he records the results of his own experimental work upon monkeys. The protocols of these experiments are presented with a wealth of detail concerning the character changes observed after mutilation which is not only engaging in itself, but supports the author's contention that negative results after frontal destruction reported by other observers may well have been due to a limited perception of these finer points.

There can be no question but that these experiments of Professor Bianchi upon the monkey are of much greater value in throwing light upon the functions of the frontal lobes in man than those of other recent workers in this field who have confined their attentions to the rat.

The latter half of the book is concerned with the problems of language, intelligence, emotion, and consciousness, which are discussed from the point of view which we have already seen developed in the earlier chapters. The author distinguishes between emotion and sentiment. The former, in his

view, is originally a primitive function of the nature of a tropism and is developed in relation especially to the increasing complexity of the sensory functions of the nervous system, and is influenced by the activities of the sensory cortex. The sentiments are the logical development of the emotions in relation to the intellectual progress which permits of those cortical representations and reconstructions, experiential and imaginative, which are the basis of abstract thinking. He brings forward evidence from his experiments on monkeys to show that the emotions are a function of the kinaesthetic zones of the cortex, and the sentiments of the frontal lobes.

The final chapter on consciousness is perhaps the most interesting of the whole book. While the value of Freud's work is in no wise belittled, the author concludes that the content of the unconscious mind is in the main controlled by the conscious mental activities, and that the explanation of mental disorders is to be sought rather in disturbance of the higher functions than abnormalities at a lower level.

Especially at a time when the cellars of psychological medicine are filled with immature and flashy stuff is it a delight to find a sound, ripe vintage such as this.

C. P. S.

The Psychology of Self-consciousness. By JULIA TURNER, B.A. (Lond.). Pp. xii + 243. 1923. London: Kegan Paul, Trench, Trubner & Co., Ltd. 6s. 6d. net.

HEREIN are presented certain ideas of the conceptual life which it is hoped will appeal more particularly to teachers, ministers of religion, and educationalists. Evidently great enthusiasm has inspired the writer into highly speculative realms where scientific thought has little place. The title to many will be somewhat misleading. Psychopathologists, we fear, will find little of value to them in this volume.

C. S. R.

Our Unconscious Mind. By FREDERICK PIERCE. Pp. ix + 323. 1922. London: Kegan Paul, Trench, Trubner & Co., Ltd. 7s. 6d. net.

THIS volume is intended as a practical exposition of the subject for the layman, so that technical language has been employed as little as possible. We can hardly consider, however, that the author's treatment of his subject would lead to an intelligent understanding of it by an unversed reader, though many useful psychological conceptions are dealt with. The chapter on the endocrine glands is unscientific in that highly speculative ideas of the relation between them and mental phenomena are here taken as accepted facts, whereas our real knowledge on this point is but scanty. Great belief, too, is expressed in auto-suggestion, of the scientific validity of which we are becoming increasingly doubtful. The latter half of the book is devoted to the application of the principles discussed to everyday life. Thinking that among many of his readers there may be some interested in the utilization of the 'new psychology' to business advertising and selling, this theme is somewhat singularly handled in a final chapter. A short bibliography is appended.

C. S. R.

Studies in Psychoanalysis. By CHARLES BAUDOUIN. Translated by E. and C. PAUL. Pp. 352. 1922. London: George Allen and Unwin, Ltd. 12s. 6d. net.

THINKING that the study of psychoanalysis in France has been neglected, the author has in this volume addressed himself to French readers, most of whom would-be beginners, but he also aims to interest the expert. The main trend of the work is to advocate a psychotherapeutic method to be founded upon "an unceasing collaboration between auto-suggestion and psychoanalysis." Theoretical considerations of suggestion are discussed, and it is stated that though a negative type of suggestion acting as a repression would be incompatible with analysis, a positive one is regarded as useful in overcoming resistances and as a guide to the patient in more ways than one. Baudouin sees the operation of suggestion in transference in a way with which a psychoanalyst could hardly agree, since he says that "the most important suggestion is the analyst's conviction of the form the transference will take, for involuntarily he suggests this form to the subject." Believing, therefore, that suggestion is so rampant in analysis, it is no wonder he thinks it would "be better to guide this suggestion instead of trying to ignore it." Such conceptions will find no favour with the orthodox analyst school.

Part I. consists of a theoretical exposition, in which the effective theory of the association of ideas is interestingly treated. Though much of Freudian work is accepted and appreciated, there is a good deal in which Baudouin differs. The concept of the censor is regarded as valuable, but it is erroneously supposed that the symbol is thought to be due to this mechanism. Freud states that symbolism is an independent factor in dream distortion existing side by side with the censor. The dream is seen as a symbolical realization of an unsatisfied tendency, and therefore is thought of in a prospective light. Part II. is devoted to the presentation of many case histories, in which we see how psychoanalytic knowledge can throw light upon the genesis of psychoneurotic disorders. We are, however, in no way enlightened as to the method of combining suggestion and analysis which the writer so extols. Considering the main thesis of the book, this must be looked upon as a grave defect. The translators in their Preface are somewhat carried away by their fervid admiration of these pages when they advocate the study of this volume for the beginner prior to reading Freud's *Introductory Lectures*, and likewise when they say that "the student will return with delight to the clarity of what is destined to become known as the Geneva school, and will read the Studies again and again." It is indeed possible that some method in which suggestion and analysis both play a part might be feasible in certain cases in which a more scientific treatment is not possible, but many pitfalls would exist into which a tyro would inevitably drop. The book has much of theoretic interest to psychotherapists, but those who have no previous knowledge of the subject would do well to gain it elsewhere first, so that they may read this volume with a more critical eye.

C. STANFORD READ.

Conditions of Nervous Anxiety and their Treatment. By W. STEKEL.
Authorized translation by ROSALIE GABLER. Pp. vii + 135. 1923.
London: Kegan Paul, Trench, Trubner & Co., Ltd. 25s. net.

DR. STEKEL'S somewhat profuse contributions to psychopathology are always attractive by reason of the easy style in which they are presented, as well because of the comparative simplicity in which difficult problems are dealt with and the dogmatism shown, which tends to leave no doubt in the mind of the uncritical reader that the truth has been arrived at. This book is the forerunner of nine others, seven of which have already appeared in German, the complete work to be entitled *Disturbances of the Impulses and the Emotions*. The volume under review in the first part deals with the manifold phenomena, mental and somatic, of the anxiety neurosis. With a valuable wealth of case material the author demonstrates the relation of anxiety to the complex symptom clinical pictures which may be met with, and points out how these are dependent upon repressed psychic factors. In many ways Stekel differs from Freud. He states that he has not been able to find the so-called 'neurasthenia' of his teacher and he recognizes no actual 'neuroses,' but only 'psychoneuroses' (or parathias), believing that *every* state of morbid fear is psychically determined. Further, he prefers to conceive of only one psychoneurosis differing in forms and degrees, though he advisedly thinks of retaining Freud's classification for the present. Anxiety is regarded as the neurotic sister of fear and engendered by the repression of the instinct of preservation linked with the sex impulse. Every neurotic has a fear of his own self, i.e., has a fear of his own conscience, his own criminal impulses, and ultimately anxiety is the fear of annihilation of the ego. Pleasure without guilt is the neurotic's ideal. Nevertheless, Stekel seems somewhat to contradict himself, for he sums up case 85 by stating that "her anxiety neurosis and insomnia were simply the result of abstinence." Freud is differed from again, in that this writer views the distinction between the sex-impulse and the ego-impulse as "artificial, theoretical and not corresponding to actual life." It can hardly be said, however, that he brings forward sufficient adequate reasons for throwing over such a fundamentally important conception, and all his clinical material tends to show the validity of Freud's views.

The second part deals with the phobias, chapters being also given on hypochondria, the psychic treatment of epilepsy, and on the border line of psychosis. The phobia is conceived of as a compromise in a fight between two effects. It is a truce enforced with the aid of anxiety, and constitutes a punishment exacted by the consciousness of guilt. Hypochondria is here looked upon as a special form of anxiety hysteria and is considered in four forms—the nosophobic form, the hysterical, the compulsion-neurotic, and the paranoidal form. Among the confused features which hypochondriacs show, it is demonstrated that the obsessional fear is a substitute for a repressed sexual experience of phantasy, that the zone involved is always an erogenous one, and that the condition has arisen through consciousness of guilt and ideas of retribution. There is a constant oscillation between sex longing and sex aversion. Stekel's views on epilepsy are well known. He believes that

so-called idiopathic epilepsy is nothing like as common as is usually supposed, and that a large percentage are neurotics who evince a great tendency to dissociation and a most marked criminality. "In the epileptic attack the moral consciousness is overpowered by the unconscious criminality." The fit is a substitute for the crime, and results from a feeling of guilt and fear of punishment.

In the third part the general psychology of fear, and diagnosis and treatment, are discussed, with a concluding chapter devoted to prophylaxis. It is to be deplored that such a brief space is given up to the technique of psychotherapy, the more so when we think that so much of the previous material might have been condensed with advantage. There are some errors which evidently are due to faulty translation, besides many spelling mistakes, which should be corrected in further editions. Theoretical considerations concerning the psychopathology of anxiety are little in evidence, and it seems that without much criticism we are asked to accept the stated conclusions. Stekel's confident assertions are somewhat alluring, but those who have knowledge of the subject will be able to note the doubtful points, and those who only require a clinical insight into anxiety states, as met with in general practice, will probably find the dogmatic attitude helpful. No fewer than 139 cases are quoted in illustration, a factor of much value. The volume should constitute a worthy addition to those publications which aim at furthering psychopathological knowledge without entering into abstruse details. Its sphere of usefulness will lie mostly among practitioners and students, though neurologists will find much interesting material. An index would enhance its worth.

C. STANFORD READ.

Remembering and Forgetting. By T. H. PEAR, M.A., B.Sc., Professor of Psychology in the University of Manchester. Pp. 242. 1922. London: Methuen & Co., Ltd.

THE author claims that this is a guide-book and not a text-book, and is meant for the general reader rather than the technical psychologist. This warning is necessary, for otherwise, in spite of the wealth of analogy and the clear statement, the book is somewhat disappointing. The descriptive psychology is so good that the reader is tempted to wish that the author had dealt in the same way with the more philosophical and physiological aspects of memory. To begin with, memory is discussed and described and distinction is drawn between the after-sensation, after-image and revived image. The relationship of percept and image and the function of the image in relation to meaning are discussed. The differences of individual mental reactions depending on differences of imagery are dealt with, and the importance of such dwelt on. The author then turns to dreams, and fully discusses the Freudian interpretation and the theory of Dr. Rivers that the dream consists in the unmasking of lower levels of experience. A long chapter is devoted to forgetting, dealing first with the problem of repression and discussing the relation of this to attention and to inhibition and facilitation. Rivers' speculations on suppression and fusion are dealt with, and the author gives his own classification of the

ways in which things are forgotten. Firstly, they may be embodied, though they are apparently insignificant, or significant but completely congruous with the personality. Under these circumstances they fail to rise out of the general mass of past experiences. Secondly, they may be exiled or suppressed, and thirdly, they may be superseded in the course of growth from one state of existence to another. An appendix is added containing chapters on synaesthesia, muscular forms, and the respectability of muscular skill. Finally, a brief quotation from Head's work is added which suggests correlation with the physiology of the nervous system.

As a whole, the book is very readable and eminently suitable for the general reader, who will not be led away into unfounded speculations or overburdened with philosophical doctrines which he cannot understand.

R. G. GORDON.

The Omnipotent Self: A Study in Self-deception and Cure. By PAUL BOUSFIELD, M.R.C.S. (Eng.), L.R.C.P. (Lond.) Pp. vii. + 171. 1923. London: Kegan Paul, Trench, Trubner & Co., Ltd. 5s. net.

This small volume, addressed purely to the laity, is a simple and non-technical exposition of the psycho-analytical principles involved in narcissism, pointing out how this mental factor may warp our reactions and how through self-knowledge it may be recognized and its evils obviated or cured. In simple language some theory of the various forces shaping character is outlined so that there may be an intelligent grasp of the main thesis of the book. Hence the unconscious mind, repression, determinism, phantasy, identification, and rationalization are severally dealt with. In the second part the practical applications are expounded under the headings of self-analysis, readjustment of objectives, readjustment of thought, and auto-suggestion. We cannot help but feel that auto-suggestion (the scientific validity of which we very much doubt) had better not have been included in this practical advice, though the author, believing in such a conception and regarding it as a beneficial adjunct, has every right to advocate its use. Suggestion and analysis do not, we think, go well together in therapy, and there will always be the tendency for the narcissist to take the easy path and neglect the latter for the former. There is no need here to give any minor criticisms. Considering the prevalence of exaggerated self-love in its various harmful manifestations and the manner in which the writer has handled the subject, we think the book should prove extremely useful to a large section of the public.

C. STANFORD READ.

Einführung in die Klinik der Inneren Secretion (Introduction to the Clinical Study of the Internal Secretions). By PROFESSOR DR. G. PERITZ, Nervenarzt in Berlin. 31 illustrations. Pp. 258. 1923. Berlin: S. Karger.

This monograph contains a useful description of all the clinical types of disorder referable to disturbance of the glands with internal secretion, viz., the pituitary, pineal, gonads, adrenals, pancreas, thyroid, parathyroids, and thymus respectively. Chapters are devoted to pluriglandular syndromes

and to the interrelation of the nervous system and the endocrine glands. While there are no actual novelties in the book, it nevertheless appears to fulfil a practical purpose in its strict avoidance of complexities and obscurities. A very large number of clinical cases reported by other observers are alluded to, but no references are given. There are a few illustrations of merit.

Symptoms of Visceral Disease : A Study of the Vegetative Nervous System in its Relationship to Clinical Medicine. By FRANCIS MARION POTTENGER, M.D., LL.D., Medical Director, Pottenger Sanatorium, Monrovia, California. Second Edition. With 86 text illustrations and ten coloured plates. Pp. 357. 1922. London: Henry Kimpton. 28s. net.

DR. POTTENGER's readable work is based largely on the idea that the meaning of symptoms should be sought in the realm of physiology: that tissues and organs are interrelated by the sympathetic nervous system, and that most of the symptoms classed generally as "subjective" or "functional" are the expression of disorder in visceral "reflexes." The innervation of œsophagus, stomach, intestinal tract, liver and gall bladder, pancreas, bronchi, lungs, heart, etc., etc., is carefully described, and the symptomatology of disordered action of these viscera is explained as being caused by impairment of function of normal "viscerogenic reflexes." From this standpoint a section of the book is concerned with the anatomy and physiology of the vegetative nervous system as a whole. The clinician will probably feel that not a little is doubtful and problematical, yet the interest of the book is undeniable: even where the author's views appear almost purely speculative, they are at least equally suggestive.

Die neurologische Forschungsrichtung in der Psychopathologie, und andere Aufsätze (Neurological Lines of Research in Psychopathology, and other Essays). By Dr. A. PICK, Professor in the German University in Prague. With eleven illustrations. Pp. 247. 1922. Berlin: S. Karger. M. 48.

THIS recent addition to the series of monographs published by the *Monatschrift für Psychiatrie und Neurologie* contains a number of stimulating contributions from the pen of Professor Arnold Pick, whose researches in the border country of neurology and psychology have always been characterised by erudition and clinical acumen, and who, further, has always exhibited a remarkably wide acquaintance with the scientific literature of other countries as well as of his own. These features are as pronounced as ever in the volume under review. Among the essays here published are the following: Motor and Static Perseveration in Relation to the Phenomena of Catatonia; The Physiology of Limb-kinæsthetic Apraxia; The Psychology of certain Recurring Utterances in Cases of Motor Aphasia; Palilalia, etc. That these will be read with interest by neurologists is apparent. The paper which gives its title to the book is notable for its philosophic breadth and scholarly style; the motto at its head is from the Scottish philosopher, Reid, that every (cerebral) nervous disease is a degree of mental disease. It contains

a reasoned plea for combined study by neurologist and psychologist, and full credit is given to the work of Hughlings Jackson along these lines half a century ago. Professor Pick's contention that palilalia is a fragment of striatal motor disorder is ingenious, but far from convincing.

Der Balken, eine anatomische, physiopathologische und klinische Studie (The Corpus Callosum, etc.). By Dr. G. MINGAZZINI, Professor at the Clinic for Nervous Disease, Royal University of Rome. With 84 illustrations. Pp. 212. 1922. Berlin: Julius Springer. M. 160.

PROFESSOR MINGAZZINI'S monograph is a model of what such works should be. It contains a particularly full description, considered from different angles, of the symptomatology of disease of the corpus callosum, congenital, neoplastic, degenerative, vascular, etc. The purely anatomical and embryological aspects are dealt with adequately: the pathological physiology of the symptoms receives careful interpretation. Well printed and illustrated, with a bibliography extending over many pages, the monograph is bound to become the classical work on the subject, and as such should be in the hands of every neurologist.

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Original Papers.

VISCERO-CUTANEOUS ANÆMIC ZONES AND THEIR SIGNIFICANCE.*

BY TH. B. WERNÖE, COPENHAGEN.

IT is an old experience that visceral diseases (e.g., digestive disturbances) are frequently accompanied by cutaneous hyperæsthesia. As early as the beginning of the nineteenth century the condition was described by Brodie, and later by Tod and Briquet, who interpreted it as local hysteria. In 1856 the Danish investigator, Fenger, advanced another explanation. In his studies on cardialgia he had excellent opportunity for observing this hyperæsthesia, which he believed was due to sympathetic disease of the intercostal nerves. This view held its ground until C. Lange, in his work on the pathology of the spinal cord, and in an article in the *Hospitalstidende*, 1875, proposed the theory that the hyperæsthesia must be interpreted as reflex pain. During abdominal operations, without narcosis, it was found that the abdominal organs were practically insensitive. They could be cut, torn or hacked about without the patient's feeling any pain. On the other hand, it was certain that under other circumstances very acute pain might be felt in the same organs. Lange explained this fact on the ground that the irritation from the diseased but insensitive organs was conducted by afferent sympathetic channels to the spinal cord, where it spread over the

* From the Department for Nervous Diseases, Frederiksberg Hospital, Copenhagen. (Chief Physician: Dr. D. Jacobson.)

cerebrospinal tracts, afterwards being projected by the brain to the ends of the spinal channels in question.

Lange's theory attracted but little notice for some years, but in 1888 Ross published in *Brain* an article on reflex pain, which embodied views of a similar nature to those which Lange had championed. Some years later Head took up the subject * and discovered that the cutaneous hyperæsthesia corresponded to zones in which herpes zoster was localised—the so-called zones of Head.

Independently of Head, K. Faber carried out a series of investigations at Frederik's Hospital on patients suffering from digestive diseases.† Faber's results did not agree with Head's. The hyperæsthesia did not always follow Head's zones, but both investigators interpreted it as a reflex phenomenon in accordance with Lange's theory. A similar conception was held by Mackenzie. As early as the '90's he had begun his studies, which to a great extent formed part of his daily practice. His interpretation was similar to that of the above-named investigators. A stimulus proceeds from the irritated organs through afferent sympathetic channels and develops in the spinal cord an irritable focus, from which the stimulus spreads to centres in close proximity. In this way arise an efferent visceral reflex, a visceromotor and a viscerosensory reflex. The visceromotor reflex arises by muscular contraction of definite areas of the abdominal wall. The viscerosensory reflex is accompanied by a cutaneous, subcutaneous, muscular, or subserous hyperalgesia.

Mackenzie has utilized these reflex investigations for determining the seat of visceral diseases, and in his work on *Symptoms and their Interpretation*,‡ he has given a comprehensive account of his experiences and observations. His investigations comprise cases of disease of the heart, gastro-intestinal canal, genito-urinary organs, peritoneum, and pleura, and he shows by a series of examples what benefit may be obtained, both in private practice and in hospital, by a detailed knowledge of the visceromotor and viscerosensory reflexes, since with the help of them alone we can often trace the diseased organ. His investigations attracted considerable notice, not only in England, but also in Denmark, and, at any rate, among the younger generation of doctors, a good deal of interest was aroused in this subject in the latter country, so that a zealous search was made for visceral reflexes as soon as a case of visceral disease was encountered which was difficult to diagnose by the usual methods. Interest soon seemed to fade away, however, the reason being that the method often failed in those cases where it was most needed, namely, in incipient cases. In these no muscle rigidity

* *Brain*, 1893, 1894, 1896.

† *Hospitalsliden*, 1899.

‡ *Symptoms and their Interpretation* (London, 1912).

is found as a rule, so that we cannot avail ourselves of the visceromotor reflexes.

There still remains the investigation of the reflex hyperalgesia, but even this, when carried out in the orthodox manner with a needle or by pinching the skin, may be associated with great difficulty. We have only the patient's statement to rely on, and usually in such cases of mild cutaneous hyperalgesia he is unable, with even tolerable accuracy, to define the limits of the hyperalgesia. It is, therefore, often practically impossible to map it out correctly in this way, and if one is uncertain of its situation one naturally cannot draw conclusions about the seat of the disease.

Personally, I have employed these methods of investigation since 1914, but they have often failed because the patient's statements were far too vague and uncertain to base a diagnosis on, and I know that many of my colleagues have had similar experiences.

By a different method of investigation I consider that I have found that Head, Faber, and Mackenzie arrived at inaccurate or even quite erroneous results, and if the experts themselves can make mistakes, it is naturally still easier for the less practised and experienced observer. The method of investigation I refer to was briefly described in the *Ugeskrift for Læger*, November, 1920, under the title "Æsthesiосcopy." The method consists in exposing the patient and allowing the surrounding air to cool the area of skin to be examined. The effect of the cold is reflexly to produce a mild ischæmia of the skin, which is most pronounced in the hyperalgesic area. If the skin is now examined in subdued light a white portion is observed in contrast to the surrounding skin, and if it is approached from all sides with a small fine needle it will be found that its limits accurately correspond to those of the hyperalgesia.*

Simple as the method perhaps appears to be, it is the outcome of a series of preliminary orientating experiments.

On investigating the sensations of heat and cold it became evident that the hyperæsthesia, besides being a hyperalgesia, was also a thermo-hyperæsthesia, that is to say, not only were the nerves for the perception of pain hypersensitive, but also those for the perception of heat and cold. Now it is generally acknowledged that many, particularly old persons, are susceptible to cold; in other words, they are usually sensitive

* In cases where the skin is previously anæsthetic we see (provided that the anæsthesia is not of central origin) the reflex anæmia make its appearance with undiminished strength, but in such cases, of course, we are unable to make control tests with the aid of a needle.

If the anæsthesia is due to partial destruction of the cutaneous nerves, the remaining ones may cause cutaneous anæmia. The area may be hypæsthetic instead of hyperæsthetic to the needle. The above cases are, however, only exceptions. The rule is that the anæmia covers an area of hyperæsthesia which can be mapped out with a needle.

to small changes of temperature, while they perhaps react relatively slightly to painful stimuli. It occurred to the author, therefore, to try the action of cold for mapping out the hyperalgesia with the aid of the patient's statements as to where the cold feeling was most marked. As a cold stimulus a light ether douche was used, which by its rapid evaporation on the skin provoked a pronounced feeling of cold. In some cases rather more certain information could be elicited by this means than by the pricking or pinching methods, but there was always the drawback that one had to be entirely guided by the patient's statements. It was clear that if the investigator could alienate himself from the patient's interpretations and statements, and himself obtain accurate information about the situation of the hyperalgesia, the method would gain in value as an objective mode of investigation in contrast to the ordinary subjective-sensation technique employed.

In view of the fact that the nerves for both heat and cold were hyperæsthetic, we should have expected that by means of equal hot and cold stimuli we could produce a dilatation or contraction of the cutaneous vessels respectively—particularly marked in the hyperæsthetic area and visible against the surrounding skin. A trial with a hot stimulus, however, did not come up to expectations. It is true that with this stimulus easily perceptible, viscerocutaneous hyperæmic zones could be brought into relief. If, for example, an appendix hyperalgesia is treated with hot fomentations and these are quickly removed, an evanescent redness is frequently observed, localized in the same zone, which can be mapped out by mechanical irritation or by that produced by cold. After prolonged application of fomentations we may also see a rather persistent hyperæmia, which may easily be detected, even by the inexperienced investigator, but the form is more diffuse and less sharply circumscribed. In addition to this, it is of a fleeting nature, in contrast to the cutaneous ischæmia which quickly supersedes it when the patient is undressed. Finally, to elicit it an apparatus is required, which, although simple, is more complicated than in the case of the cutaneous ischæmia, which becomes established as soon as the patient is exposed to the mild action of the cold exerted by the air at ordinary room temperature.

It necessitates some practice to detect this poorly pronounced anæmia, but the same applies to most of the other clinical methods of investigation, and if care is taken to examine in diffused light, excluding direct light and intermingled reflections, the investigation is not difficult; moreover, it is simple and not dangerous.*

* The anæmia is most readily observed by daylight. But also at night the examination can be made without difficulty, most easily by using green light. The investigator places himself in front of the source of light in such a way that his

With the aid of this method I have examined about 3,000 patients since the spring of 1920. The majority of these came from private practice and the provincial hospitals. Since the spring of 1921 I have had the opportunity of examining about 800 patients in this and other departments of Frederiksberg Hospital. The above figures are only approximate. I did not keep an accurate record, nor would it have been of much interest, as most of the cases were simple and straightforward cases of visceral diseases, like tracheitis, bronchitis, pneumonia, gastritis, enteritis and colitis, and as regards the genito-urinary system, cystitis and pyelitis, births and abortions.

The method has, of course, no diagnostic importance in these easily recognisable diseases, but the reason that the number of cases investigated is relatively so large is that I have consistently examined every patient whom I have had the chance of investigating, both in hospital and private practice, for cutaneous anæmia. I have thus been able to get an impression of the distribution of reflex hyperalgesia in different visceral diseases, which, even if at times it needed deeper study, nevertheless allows one to deduce some general rules regarding the occurrence of reflex hyperalgesia.

The best-marked cutaneous anæmia is seen in those cases where there is an attempt to overcome the obstruction of some canal by tonic contraction of smooth muscle, e.g., in cases of intestinal obstruction and colic of different kinds. As the pain increases in strength the anæmia gradually becomes greater, but always in a proximal direction, while the distal limits are unaltered. The lower boundary, however, is sharper and more clearly marked off from the adjacent skin, while the upper boundary is more diffuse and vanishes in the proximal direction. This extension of the hyperalgesia in the proximal direction was previously described by Mackenzie, and his explanation of it, which is undoubtedly the right one, is that the distal boundary corresponds to the site of the stricture. The colic is initiated by the muscles immediately proximal to the obstruction endeavouring to overcome it by violent contraction. By degrees, as more and more muscles take part, the pain and irritation spread to higher segments, and in conjunction with this the anæmia increases. But on the distal side of the obstruction the spasm yields and, therefore, reflexes do not proceed from this

shadow is projected on the patient's skin. The anæmia then shows up as a light zone against the surrounding darker parts.

The examination by daylight is conducted on the shaded side by turning the part of the skin to be investigated away from the light, or a screen (perhaps the investigator himself) is interposed between the patient and the window so that the shadow is projected on the patient's skin. Furthermore, the investigator must wait a minute or more until his eye gets used to the light, and until the vaso-constrictor reflex is put into action. The anæmic zones are then observed, as a rule, without difficulty.

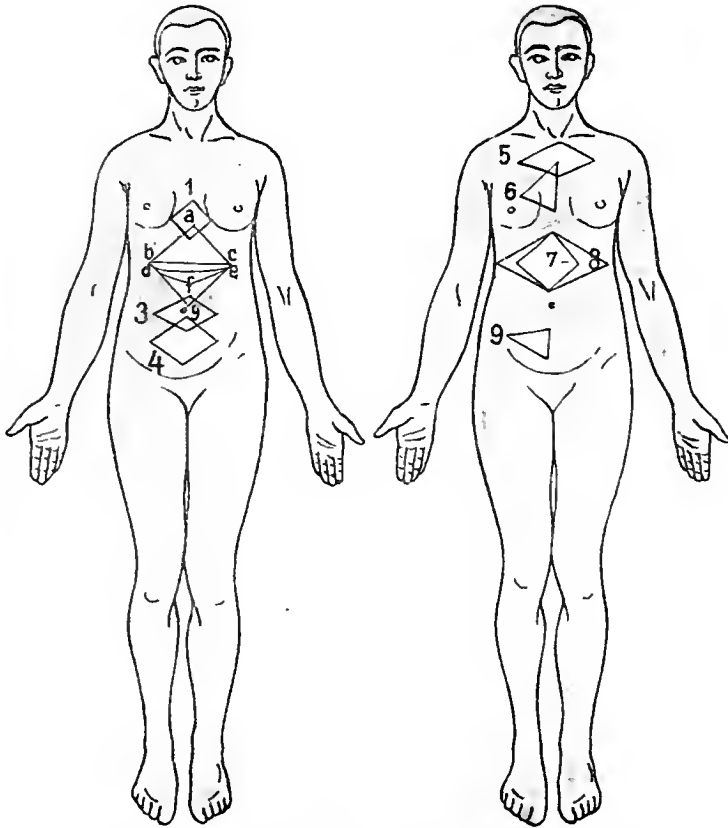
The examination can also be made on jaundiced skin but it is rendered difficult if the skin is previously anæmic, or very hairy.

part, nor does it cause reflex cutaneous anæmia. The distal boundary of the cutaneous anæmia thus corresponds to the site of the obstruction. If on the basis of this we wish to determine, for example, the afferent segmental innervation of the alimentary canal in the whole of its extent, we must have at our disposal many cases of stenosis of the canal or the ducts of the corresponding glands, preferably verified by operation. Such material has not been at my disposal, but a close estimate may be obtained from the cases I have observed.

Although cases of stenosis of the gastro-intestinal canal or the ducts of the glands belonging to it, which have been confirmed by operation or *x*-ray examination, are relatively poorly represented in my material, most of the cases of reflex anæmia I have observed have been caused by gastro-intestinal disturbances. In the summer of 1920 alone, during an epidemic of febrile painful gastro-enteritis, I had the opportunity of following the course of reflex anæmia in about sixty patients, from the beginning to the end of the illness. Later on these observations were supplemented by a large number of a similar kind in patients with mild and transient digestive disturbances, such as it is every busy doctor's lot to see in daily practice and in the hospitals. These cases, which otherwise do not greatly attract the attention of the investigator, have been of particular interest to me, since, with their constantly accompanying, double-sided and centrally situated reflex anæmia—apparently subject to some law—they have suggested to me the idea that is the central one in the whole method of investigation: *Double-sided reflex anæmia is present in diseases of unpaired organs, and one-sided anæmia in diseases of paired organs*, as will later be further emphasized. But it has not been of use in determining the level of the seat of the disease because, although we can assume that an acute and painful abdominal disease attended by diarrhœa with pathological stools is due to a lesion of the unpaired organ, the intestinal canal, there will always be doubt as to the segment in which the disease is mainly or exclusively located. With the experience I have acquired from my present cases I consider that, within certain limits, I can determine it with the help of æsthesiосopy alone. The various facts relating to the diagnosis of the level have been obtained from relatively few but, on the other hand, definite cases, where the diagnosis was either verified by operation, post-mortem examination, or *x*-ray investigation, constituting a total of fifty.

In the acute gastro-intestinal affections the reflex anæmia may gradually spread over the whole abdomen as the disease progresses. Such an extensive reflex anæmia is seen only extremely rarely. The rule is that the anæmia occurs in four phases. If one is called to the patient shortly after the pain has started, a reflex anæmia such as is shown in *Fig. a-d-f-e* is found. As will be seen later, this anæmia

does not correspond to that which is observed in isolated gastric diseases, but to that observed in gastro-duodenal affections, which is presumably accounted for by the fact that the infection usually does not give rise to clinical manifestations until the duodenum is involved in the morbid process. Afterwards the anæmia spreads, with its lower edges pointing obliquely downwards towards the umbilicus (*Fig. a-d-g-e*). The next



(For meaning of figures see under last illustration.)

phase is a periumbilical anæmia (*Fig. 3*), often with somewhat curved borders, but most frequently bounded by straight lines. This kind is most often associated with acute diarrhœa. It corresponds to irritation of the small intestine, and is usually well defined and easy to observe. The third phase is the infra-umbilical anæmia of colon affections which, when the sigmoid is included, extends to the symphysis and then appears on the back as a similar symmetrical anæmia situated

in the lumbar segment region. The fourth phase is the rectal anæmia, occurring exclusively on the back (see *Fig. 16*).

These facts could be adduced with a good deal of certainty from the diagnostic reasoning, commonly employed long before definite criteria could be obtained from cases of stenosis. But such observations could not form the basis for any certain estimation of the level of the lesion. For this purpose, as already explained, a number of accurately diagnosed stenosis cases are required. With the aid of those which constitute my material, however, I maintain that I am able to a great extent to establish the segmental demarcation of reflex anæmia for the various segments of the intestinal canal, and at the same time, also, their afferent sympathetic innervation. This must correspond to the segmental situation of the cutaneous anæmia. If this were not the case the visceral reflexes would be abolished by transverse lesions of the cord, which does not happen. As will be later explained, experimental investigations are in favour of the view that reflex arcs are unisegmental, so that it is permissible in definite cases to determine the afferent sympathetic innervation of the segment of an organ from the segmental position of the lower boundary of the corresponding anæmia.

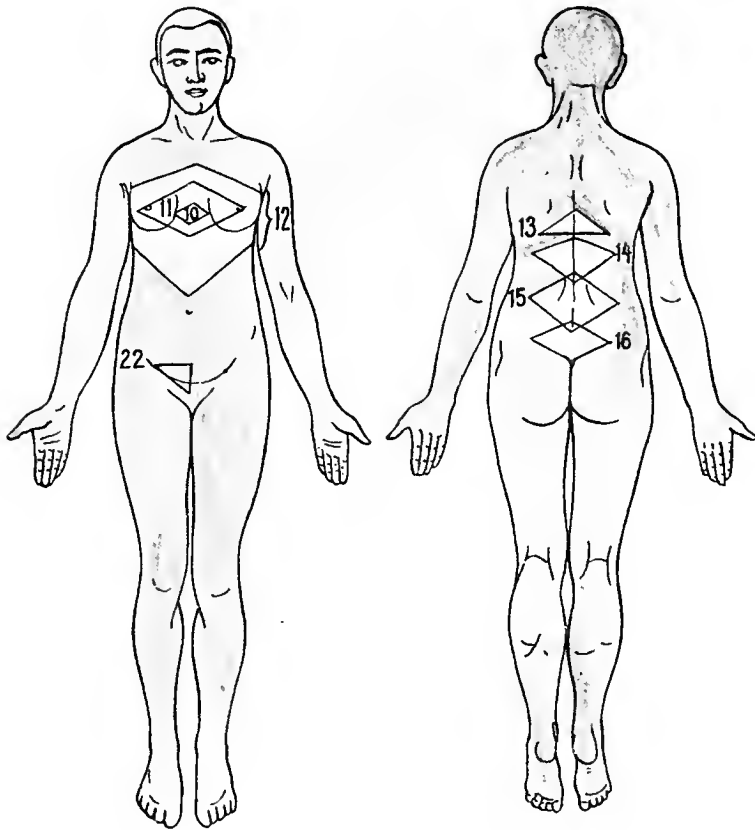
Four cases of stricture of the cardiac end of the stomach, one of which was confirmed by *x*-ray examination and one by post-mortem examination, were accompanied by cutaneous anæmia, as shown in *Fig. 1*, with the lower border running through the 5th and 6th dorsal segments. Three cases of pyloric stenosis (seen by *x*-rays) showed reflex anæmia corresponding to *Fig. a-b-c*—therefore with the lower border at the boundary between the 8th and 9th dorsal segments. The afferent channels of the stomach must therefore go principally to the 6th, 7th and 8th dorsal segments. Eight cases of cholelithiasis were associated with reflex anæmia, with the lower border running horizontally through the 9th dorsal segment. The opening of the common bile duct must then correspond to the 9th dorsal segment, and the part of the duodenum above it to the 8th and 9th dorsal segments.

An unmarried man of twenty-seven who, with a suicidal purpose, had drunk about 100 c.c. concentrated corrosive sublimate solution, was admitted to hospital an hour after swallowing the poison, and the stomach was washed out with 12 litres of water. A quantity of blood-clot was found in the washings, indicating a considerable erosion of the mucous membrane. The reflex anæmia at this time corresponded to *Fig. a-b-c*, and therefore the case was looked upon as an isolated diffuse affection of the stomach. In the next few days the anæmia spread in a distal direction, the lowest point reaching to about the boundary between the 9th and 10th dorsal segments, and the duodenum must, therefore, now have been attacked by the irritative process.

In association with this the anæmia localised in the spinal region of the

back was observed to spread in a distal direction, but was quickly arrested. The small intestine or, at all events, the large intestine, could therefore not be directly implicated in the lesion.

Five cases of duodenal ulcer were accompanied by anæmia, as shown in *Fig. a-d-e-f*, from which we can conclude that the duodenum's afferent innervation must, at least, reach as far as the middle of the 9th



(For meaning of figures see under last illustration.)

dorsal segment. It probably extends as far as the 10th dorsal segment, judging from the following case.

A woman of seventy-eight had an excision of the pyloric region performed for ulcer of the pylorus, and afterwards closing of the gastric ulcer and duodenal ulcer, as well as a gastro-enterostomy, after measuring off 50 cm. of small intestine. About a fortnight after discharge from hospital she sought readmission for an attack of intestinal obstruction (bile-stained vomiting, constipation, absence of flatus, pain and tenderness in the epigastrium, fever,

and small, soft pulse). By means of aesthesioscopy a reflex anæmia resembling one of duodenal origin was found, which extended to the 10th dorsal segment in the middle line. Judging from this the pain ought also to have been emanating from a duodenal lesion. The vomit was bile-stained, and thus the passage from the common bile duct through the anastomosis to the stomach must have been free. At first we might therefore assume that the obstruction was due to the closing of the distal loop of the anastomosis: its position was known precisely. Providing the diagnosis was correct, this would afford the opportunity of determining the segmental position of the piece of small intestine in question.

At the operation, however, an abscess was found originating in the duodenal blind sac, and perforating it by successive periduodenal layers of pus. The case is useful as illustrating the reliability of the method, but for accurate determination of the segment it could not be employed.

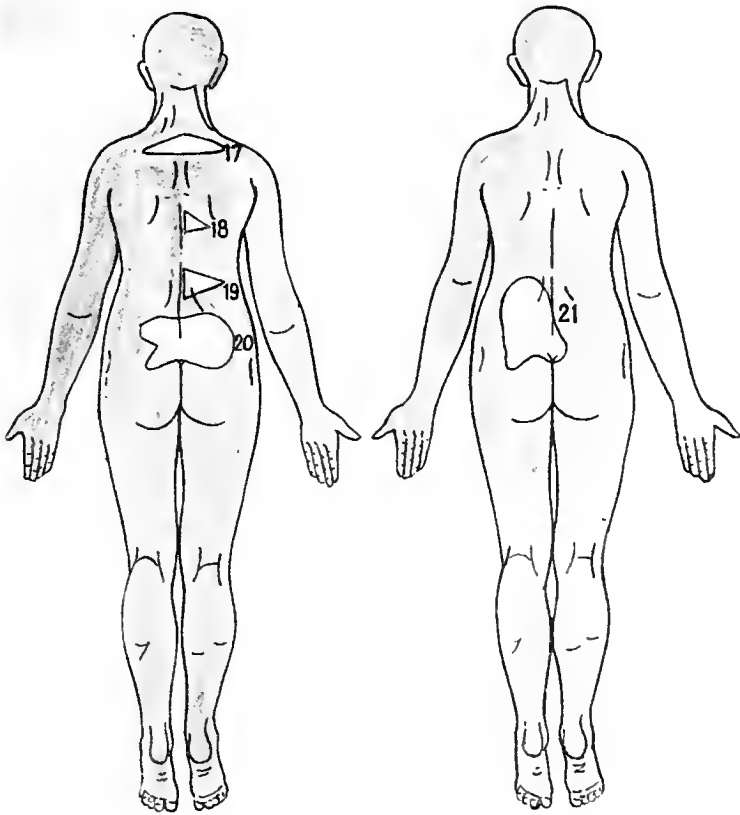
As mentioned above, duodenal reflex anæmia extends, at any rate, to the lower boundary of the 9th dorsal segment. This being so, the small intestine must practically belong to the 10th and upper part of the 11th dorsal segments. It is, perhaps, rather surprising that in view of the length of the small intestine, it corresponds to so few segments. It must be so, nevertheless, for, as stated above, the duodenal anæmia reaches, at least, to the lower border of the 9th segment, and the ileo-cæcal portion belongs to the upper half of the 11th dorsal segment. This is based not only on the fact that a case of ileo-cæcal obstruction was accompanied by anæmia, the lower border of which just reached the point named, but also because appendicitis is sometimes associated with narrow periumbilical areas of anæmia (in which case we may expect to find an isolated appendix) and sometimes by infra-umbilical areas of anæmia, when we may expect to see perityphlitic adhesions at the operation, or principally changes which indicate an accompanying lesion of the colon.

The remainder of the intestinal canal corresponds to the sacral and lumbar, as well as the 12th and partly the 11th dorsal segments. The ascending, transverse, and descending colon reaches to the lower boundary of the 12th dorsal segment, while the sigmoid flexure of the colon and the rectum belong to the lumbar and sacral segments. The boundary between the last two seems to correspond to the 3rd lumbar segment: at any rate, the following case was diagnosed on the basis of this assumption.

An unmarried sailor of forty was treated for subchronic enteritis on account of continuous diarrhœa. Nothing abnormal was found on rectal examination, nor on palpation of the abdomen. But by means of aesthesioscopy lumbar anæmia was discovered on the back with the lower boundary running through the 3rd lumbar segment, and, in front, a narrow anæmic band in the lower part of the 12th dorsal segment. The disease could not be

due to a rectal lesion because, as is seen in cases of carcinoma of the rectum, it would then be associated with anæmia extending to the sacral segments, perhaps as far as the 5th.

Presumably, therefore, the disease depended upon a deep-seated affection



Reflex anæmia observed in: (1) Stricture of the cardiac end of the stomach.—(a-b-c). Pyloric stenosis.—(a-d-e). Cholelithiasis.—(a-d-g-a). Duodenal ulcer.—3) Enteritis.—(4) Colitis.—(5) Tracheitis.—(6) Bronchitis.—(7) Asthma (br.).—(8) Uterine disease.—(9) Pneumonia.—(10) Pericarditis.—(11) Angina pectoris.—(12) Aortitis.—(13) Gastritis.—(14) Enteritis.—(15) Colitis.—(16) Carcinoma of the rectum.—(17) Aneurysm of the aortic arch.—(18) Bronchitis.—(19) Renal calculus.—(20 and 21) Hyperæsthesia in traumata.—(22) Ureteric colic.

of the colon or a lesion of the sigmoid. At the operation a constricting inoperable carcinoma of the sigmoid was found.

To the most frequent and most easily diagnosed æsthesioscopic findings belongs infra-umbilical colitis anæmia. We had a particularly good case in the hospital.

A male paralytic of thirty-seven complained one day of violent pain in the abdomen, which was accompanied by thin stools containing a good deal

of blood. The blood was bright-coloured and liquid, so that the possibility of a foreign body having been introduced into the rectum was considered. The patient was resentful and violent—several of the *personnel* had damaged faces in witness of his spitefulness. Exploration of the rectum would therefore be difficult, and probably further provoke the patient.

It was, therefore, an advantage to be able to dispense with this examination and make a diagnosis of the level of the lesion. As often as the patient was covered up he tore the clothes off himself, and frequently lay naked in his bed. A well-defined infra-umbilical anæmia then appeared on the abdomen, as depicted in *Fig. 4*. The pain must, therefore, have been due to a colon infection, and the cause was not far to seek; on account of a strong Wassermann reaction he had received a test injection of calomel the day before in double the usual dose (0.10 grm.).

To the most definite and unmistakable viscerocutaneous anæmias belong those which can be observed during the pains of labour and which disappear in the pauses. There is no doubt in this case that the factor causing the pain is the uterine contraction.

Uterine reflex anæmia is usually first seen and most marked on the back, where it occupies the same segments as rectal reflex anæmia (*Fig. 16*), a fact which explains why it is that a woman in labour is occasionally surprised by the birth of her child during a visit to the lavatory, because she has confused the early labour pains with tenesmus. But in addition, we usually see epigastric anæmia (*Fig. 8*), and finally, the stimulus may spread to the lowest dorsal segments, when an ascending cutaneous anæmia may be observed in front, which during strong pains may reach right up to the epigastric anæmia.

As in the case of gastro-intestinal disease, this kind of anæmia is also represented in the spinal region. In this and subsequent cases the most marked anæmias will be principally dealt with—those which are applicable for diagnostic purposes.

As already mentioned, we usually also find in uterine diseases a rather extensive, although less distinct, epigastric anæmia (*Fig. 8*). The reason that uterine diseases are accompanied by reflex anæmia at such widely different levels, I think, must be sought for in the fact that the arterial supply of the uterus comes partly from the uterine artery and partly from the internal spermatic artery. Everywhere in the body we find an intimate association between the vessels and the surrounding tissues, which might indicate that the afferent channels of the vessels as well as the surrounding tissues go to the *same* spinal segments, and are then directly connected with reflex arcs; otherwise transverse lesions of the spinal cord would be attended by marked vasomotor disturbances, which is known not to be the case, any more than that the cutaneous visceral reflexes are put an end to in such cases.

If we proceed on the assumption that the above explanation is correct, it is intelligible that the uterine tissue supplied by the internal spermatic artery may cause, when stimulated, the cutaneous anæmia at the high level, while that supplied by the uterine artery will occasion the anæmia at the lower level.

Appendicitis and colitis also often occasion a similar epigastric anæmia without being supplied by arteries of high origin. The cause in this case is to be found in the disposition of the omentum. This structure starts from the stomach, is firmly attached to the colon, and in appendicitis it is frequently adherent to the appendix. In such cases every movement of the patient induces slight pain by dragging on the omentum. It is supplied, however, by the cœliac artery, and thus its afferent sympathetic channels must go to the high-level segments, which is in harmony with the fact that the pain is felt in the stomach and that the reflex hyperalgesia is situated in the epigastrium.

Experimentally, analogous conditions can be shown to exist in cold-blooded animals. Fish (eel or eod) are principally used as experimental animals, and they are decapitated to ensure the presence of spinal reflexes only. If a piece of the intestine of an eel is stimulated by a faradic current, a marked intestinal spasm is momentarily produced. If the gut is stroked up and down a few times with two needle-shaped electrodes 2 mm. apart, a tetanic contraction is evoked, which may continue for several hours.

If now we investigate the reflex irritability of the skin by passing electrodes (between which there is a weak constant or faradic current flowing) slowly along it, we shall observe that the part outside the skin area corresponding to the stimulated portion of gut reacts more briskly than the rest of the skin. This is an experimental viscero-cutaneous hyperæsthesia which, on account of the animal's segmental constitution and intestinal canal of rather straight course, is located in the skin at the level of the stimulated portion. If the experiment is repeated after about fifteen minutes' interval, it is found that the irritability, instead of being increased, is now depressed in comparison with that of the rest of the skin; and if it is repeated again twenty minutes later, practically no muscular contraction is produced by stimulating the part in question.

The reason of this is easy to demonstrate. If the eel is lifted up it is found that the part we are dealing with is as rigid as a stick, while the parts above and below are relaxed. The muscles of this part of the body are in a state of tetanic contraction, and so no further muscular contraction can take place, that is to say, we have an experimental viscero-motor reflex. These phenomena are equally well marked on both sides.

Experimentally we can also produce viscero-cutaneous reflex anæmia by means of adrenalin injections. If, for example, we inject

into the spleen of a decapitated eel, whose circulation is stopped by preliminary ligature of the heart, about 0.1 c.c. of a 10 per cent. adrenalin solution, we shall observe, after a few minutes' interval, white patches appearing on the skin at the level of the spleen, and always bilaterally.* In a successful experiment the skin becomes as white as snow, but it is always distinctly anæmic. Good bilateral cutaneous reflex anæmia is also seen on injecting adrenalin into the gall-bladder, and on painting the surface of the intestine and liver with it. Sometimes the anæmia assumes exactly the same form as is always observed in man, i.e., fan-shaped, with the base towards the middle line, but as a rule we only get anæmia of more irregular form, and it must be added that genuine and well-marked reflex anæmia is often accompanied by a less distinct general anæmia, which must be due to a reflex through a higher vasomotor centre. Experimental cutaneous anæmia is not quite comparable with that observed in patients, but it should be remarked, at any rate, that injection in unpaired organs (spleen, gall-bladder, etc.) is always accompanied by double-sided cutaneous reflex anæmia.

That the vessel reflexes involved are of spinal origin is proved by the fact that all the animals were decapitated; but we may further conclude that the reflex must be unisegmental, since it is not abolished, although the spinal column is carefully divided from behind. On both sides of the section which pass through skin, muscles, and cord, the cutaneous anæmia extends to the dorsal middle line. The reflex must, therefore, occur in the various intact segments. In agreement with this we must assume that experimental viscerosensory and visceromotor reflexes take place by means of unisegmental reflex action.

But the main point is, that the cutaneous and muscular reflex phenomena of spinal origin, which can be elicited by stimulation of the muscles of the viscera, are located in the same region of the body as the first and most marked cutaneous vaso-constrictor reflexes to appear through the local action of adrenalin. It must be concluded from this that the muscular afferent sympathetic channels of the viscera and the corresponding afferent channels of the vessels have the same segmental innervation: in other words, from a knowledge of the arterial supply of an organ innervated by the sympathetic system, we can predict what the afferent nerves of the organ will be, and consequently the site of the cutaneous visceral reflex phenomena. Similar conditions must presumably apply to man, as has been shown in the case of uterine diseases and the organs furnished with omentum.

The visceral aortic branches have undergone changes during development, resulting in displacements and fusions, which make it

* The blanching is due partly to cutaneous anæmia and partly to cutaneous pigment retraction.

impossible to decide the segment an artery belongs to, directly from its place of origin. But the theory readily explains why cardialgia can so frequently accompany different visceral diseases, and conversely, from undoubted cutaneous reflex anæmia, the place of origin of which is known, we can predict the innervation of the organ's vessels and the segments to which they belong. When, for instance, one knows that gastric reflex anæmia is located in the 6th to 8th dorsal segments, one can conclude that the celiac artery corresponds to the 6th to 8th thoracic segments, irrespective of the fact that its origin is displaced in a distal direction, so that anatomically it belongs to the abdominal aorta. From considerations of space, a review only of the results which can be obtained from the theory will be given at the end of the article.

Reverting now to the æsthesioscopic observations in man, it is intelligible why we observe prostate diseases attended by reflex anæmia of the same distribution as that of uterine diseases, usually only visible on the back (*Fig. 16*). A prostate reflex anæmia was the first case I had the opportunity of examining. It was that of an unmarried man of nineteen, who had pyuria and lumbar pain, and was admitted for treatment for pyelitis. In a dim light distinct anæmia of the skin could be seen corresponding to the seat of the pain. The situation was as shown in *Fig. 16*, and therefore pyelitis could not be the cause. On exploring the rectum a tender and enlarged prostate was found, and a microscopic examination of the urethral secretion disclosed the gonococcus.

Diseases of the Fallopian tubes and ovaries are but seldom associated with well-marked anæmia. It is situated in the 10th to 12th dorsal segments, with possibly secondary cutaneous anæmia in the 7th to 9th dorsal segments.

In the case of the kidneys I have often seen reflex cutaneous anæmia accompany pyelitis. It is more pronounced in the case of renal calculus, being practically always unilateral (*Fig. 19*). Gradually, as the stone slips further down the ureter, the lower border of the anæmia, which is now more distinct in front, is displaced further and further down towards the symphysis (*Fig. 22*).

I have no data referring to pancreatic and splenic diseases. Judging from the place of origin of the arteries supplying these organs, the position must roughly agree with the anæmic zone of the stomach and biliary passages. Diseases of the heart and pericardium are also frequently attended by reflex anæmia. As a rule it is not so marked as that we see in gastro-intestinal diseases, but distinct enough to be discerned. The reflex anæmia is bilateral, as elsewhere, when it is a question of the unpaired organs. The position corresponds usually to *Fig. 11*, but I have also observed it corresponding to *Figs. 10* and *12*.

I have not had the opportunity of making a careful investigation of its lowest limits in stenosis of the different orifices. Presumably, diseases of the heart, coronary arteries, and the part of the descending aorta belonging to the 5th to 7th dorsal segments are represented by the same reflex anæmia, while diseases of the aortic arch produce anæmia situated at a higher level. Dr. Levison, the physician to the department, has reported to me a case of aneurysm of the aortic arch accompanied by well-marked, centrally placed bilateral and symmetrical cutaneous anæmia extending to the 6th cervical segment (see *Fig. 17*).

Lower level aortic segments must cause lower level reflex anæmia. Experience is lacking, however, in this connection, but we had the chance of observing in hospital a case of aortic thrombosis.

An unmarried woman of thirty-three, suffering from manic-depressive psychosis, complained one day of violent pain in the loin and in the front and sides of both legs. In the course of a few hours the patient became completely paralytic in both legs, which were anæmic, cold, and pulseless.

The bilateral condition in conjunction with the complete anæmia and cessation of femoral pulsation pointed to an aortic stenosis, which must have been situated just over the bifurcation, as the lesion was not accompanied by intestinal trouble. This would be the case if the mesenteric artery was involved in the process. At the autopsy a thrombus was found, as expected, which occluded the lumen as far as about 3 cm. above the bifurcation and extended downwards into both iliac arteries.

The extreme anæmia of the legs in this case naturally could not be looked upon as a visceral vaso-constrictor reflex, as it was merely the consequence of the lack of blood supply. But the pain radiated into the lumbar segments and missed the sacral segments, which is just the distribution we should expect to find in reflex hyperalgesia caused by aortic stenosis in the lower lumbar segments. On the back there was well-marked bilateral, symmetrical anæmia, corresponding roughly with *Fig. 15*.

In Mackenzie's work there is no mention of the reflex hyperalgesia associated with diseases of the respiratory organs. The pain which accompanies violent coughing is assumed by Mackenzie to be due to myalgia brought on by the excessive use of the respiratory muscles. During the influenza epidemics, however, I frequently saw such cases attended by cutaneous anæmia similar to that observed in other visceral diseases, which would seem to show that the pain is of reflex origin. This has been assumed by several other investigators, and a closer examination confirms this view. Tracheitis is associated with pain located in the region around the upper portion of the sternum, but pain is also felt well out to the side, that is to say, considerably outside the tracheal boundaries. In bronchitis, pain is felt further down on the front of the chest, or in the back, where we often find local myalgia ;

but in unilateral bronchitis the pain and the myalgia are also limited to one side. If the myalgia was caused by the excessive use of the respiratory muscles we should expect to find bilateral myalgia in unilateral bronchitis.

Asthma cases are often accompanied by what Rosenthal calls epigastric aura, that is to say, an oppressive sensation in the epigastrium, and in harmony with this there is an epigastric cutaneous anæmia (*Fig. 7*). That this pain must be of a reflex nature follows from the fact that its site is completely outside the pneumonic area. It is still more obvious that the pain which often ushers in pneumonia must be of reflex origin, since it is generally located in the hypogastrium and occasions attacks simulating appendicitis (*Fig. 9*). The anæmia is usually poorly developed and often difficult to see. Its position will be seen from *Figs. 5, 6, 7, and 9*.

The most important forms of visceral reflex anæmia that I have had the opportunity of seeing have now been briefly passed in review. In addition to these there are some which occur most frequently of all, of which we see numerous examples daily in the hospital, namely, those accompanying neurotic conditions, such as fear and depression. They disappear when the depression passes over into exaltation, and return when the depression takes possession of the patient again. In these cases we must presume that a triple reflex is involved :—

1. A psycho-visceral reflex, causing the visceral spasm.
2. A viscerosensory reflex, which leads to the cutaneous hyperæsthesia.
3. A spinal vasoconstrictor reflex, upon which the cutaneous anæmia depends.

We have, therefore, to deal with a psycho-visceral cutaneous reflex anæmia.

The application of the method in the diagnosis of peripheral neuritis and neuralgia of various kinds, as practised in the hospital, will not be further dealt with here. It need only be added that the action of the slight degree of cold afforded by the room temperature often does not suffice, in the presence of hyperalgesia of the extremities, to produce definite anæmia, for which reason we avail ourselves of a method devised by Levison and Haunö, where a cold air-douche is used which, even on the cool extremities, calls forth well-marked anæmia.

But it is necessary to point out that cutaneous anæmia may be observed to be a pure psychic vasoconstrictor reflex, for instance, frequently in traumatic cases and in persons who are operated upon, if their attention is directed in a morbid degree to the region of the operation. Irrespective of the fact that the operation may have been carried out satisfactorily in every respect, with perhaps perfect healing

and hardly any visible scar, we may observe poorly developed cutaneous anæmia of irregular form in these patients in the region in question. It is increased by the action of cold, but also by the amount of attention the patient bestows on it. From a diagnostic standpoint, there is no trouble in distinguishing this irregular anæmia, often of variable contour, from the visceral and psycho-visceral kinds which are always fan-shaped with the base towards the middle line, or from neuritic reflex anæmia, which corresponds to the distribution of the given nerve trunk.

Putting aside the last three forms of cutaneous anæmia, and comparing the results of the investigations into the viscero-sensory reflex hyperæsthesia obtained by means of æsthesioscopy with those obtained by Head, Faber, and Maekenzie, it will be seen that there is want of agreement on several points. Reflex hyperæsthesia does *not* correspond to Head's zones, as Head found. Whether it is situated in front or behind, it has a fan-shaped form with the base towards the middle line, and even if the hyperæsthetic area encompasses several segments, the fan-shaped contour is maintained. Although it has been frequently stated above that the hyperæsthesia corresponds to one or more of Head's zones, this simply means that the distribution in the middle line corresponds to them, while out towards the sides it terminates in a pointed figure, as indicated in the accompanying illustrations.

The same thing has already been shown by Faber's investigations, where in some of the cases the reflex hyperæsthesia had precisely the same delta-like form as that observed by æsthesioscopy. On the whole, however, Faber finds that reflex hyperæsthesia corresponds roughly to Head's zones in position, on which point his results differ from those we obtain by observing the reflex hyperæsthesia outlined by the organism itself. But apart from this, twenty-four of Faber's thirty-four cases, at all events, must be incorrect, since they are recorded as unilateral hyperæsthesia. By æsthesioscopy we always see without exception reflex anæmia, originating in unpaired organs with sympathetic innervation, represented by double-sided, centrally placed symmetrical figures. In the case of the organs limited to one side of the body (for example, the appendix), the anæmia is found best marked on the same side, and in view of the fact that the hyperæsthesia is symmetrically placed, it can be understood that the patient's attention is exclusively fixed on the more pronounced hyperæsthesia, so that the milder anæmia on the opposite side is not noticed; for this reason the investigator's attention may be directed to the more marked hyperalgesia; yet the anæmia is always present on the opposite side also, and can usually be outlined with a needle.

The fact that reflex hyperæsthesia originating in unpaired organs

innervated by the sympathetic system is always bilateral must necessarily be fundamental, as it is the pivot on which the diagnostic conclusions obtained with the help of æsthesiopy depend. We certainly cannot conclude that double-sided hyperæsthesia always emanates from an unpaired organ, seeing that it can originate in two simultaneously stimulated paired organs (for example, in cases of bilateral pyelitis). But we may conclude with certainty that unilateral hyperæsthesia originates in a paired organ, for in the case of an unpaired viscus it would, of course, have been bilateral. (With the help of æsthesiopy we are thus able to distinguish unilateral epigastric renal reflex anæmia from that originating in the biliary passages, ureteric anæmia from appendix reflex anæmia, and so forth.)

As already remarked, the viscero-sensory and viscero-motor reflexes, as well as the viscero-cutaneous reflex anæmia in the experimental investigations, originating in unpaired organs, were always bilateral. In view of the fact that Faber's investigations only dealt with reflex hyperæsthesia originating in the digestive canal, there can be no doubt that the results recorded as unilateral reflex hyperæsthesia must be fallacious. Head also found chiefly unilateral reflex hyperæsthesia, although relatively often bilateral in intestinal diseases. Nor was Mackenzie's attention directed to this point. Thus, in his work, reflex hyperalgesia in cholelithiasis and angina pectoris is described as unilateral. On the other hand, reflex hyperalgesia originating in the gastro-intestinal canal is depicted as centrally disposed but in rounded areas which depart considerably in shape from those observed by æsthesiopy. The estimation of the level at which it occurs, however, agrees with what I found in my cases, as, in harmony with Mackenzie's finding, I observed, for example, that reflex hyperalgesia in the case of the gastro-intestinal canal is not dependent upon the situation but upon the distal position, so that reflex hyperalgesia from a part of the colon situated at a high level occupies a lower position than corresponding hyperalgesia arising from a loop of small intestine which has fallen down.

In accordance with this, we find that reflex hyperalgesia associated with the respiratory organs is arranged according to its remoteness from the centre.

Thus, the order is tracheal reflex hyperalgesia: below this, hyperalgesia originating in the bronchi; next, asthma hyperalgesia, which must arise in the bronchioles; and lowest, pneumonia hyperalgesia, which may reach to the lower border of the 12th dorsal zone of Head. E. Zak (*Wien. klin. Wochenschr.* 1919-20) has previously described hyperæmic, half-moon-shaped skin zones, which can sometimes be observed in visceral diseases (diseases of the aorta, for instance). The author interprets these hyperæmic zones as the result of viscero-vasodi-

lator reflexes comparable with the previously mentioned visceromotor reflexes. This explanation is undoubtedly erroneous. I have frequently had the opportunity of observing similar hyperæmic zones, but they are found on the border of the anæmic zone and are, undoubtedly, merely to be regarded as stasis phenomena caused by the blood from the anæmic area of skin being forced out into the anastomosing cutaneous vessels.

The following are the general rules relating to the occurrence of reflex hyperalgesia which can be deduced from the results of the investigation :—

1. Reflex hyperalgesia originating in *unpaired* organs is always *bilateral*.

2. *Unilateral* reflex hyperalgesia is due to diseases of *paired* organs.

3. The organs have the same afferent innervation as the vessels supplying them.

4. The lower border of the reflex hyperalgesia in cases of obstruction of a lumen corresponds to the afferent segmental innervation of that part of the organ which lies immediately proximal to the obstruction.

The detection of the organ involved must be made with the help of (1), (2), (3), and (4), and the diagnosis of the level of the disease with the help of (4).

If, for example, we are dealing with a case of appendicitis, we know from (1) that any accompanying reflex hyperalgesia will be bilateral, as the appendix is an unpaired organ. If we find marked unilateral hyperalgesia or hyperalgesia which only crosses the middle line by a narrow margin, we know that it must arise from a paired organ. First of all, one would think of the ureter or disease of the Fallopian tubes, and make an investigation in this direction. But the lungs are also paired organs, and pneumonia, as is known, may be ushered in by attacks resembling appendicitis at a time when the stethoscope yields negative results. In conjunction with rising temperature, pseudo-appendicitis pain might possibly be taken as an indication for operation. In such a case the æsthesioscopic picture would prevent the misconception. Personally, I have twice warned against operation on these grounds, and in both cases a right-sided croupous pneumonia eventually developed.

In a similar manner renal colic can in certain cases be distinguished from gall-stone colic, ureteric colic from labour pains, intercostal neuralgia from angina pectoris, and so on.

On the other hand, we naturally cannot conclude that an unpaired organ is the cause of bilateral hyperalgesia. In pyelitis cases, for example, we frequently see double-sided hyperalgesia, not because the pyelitis is complicated by disease of unpaired organs, but because it is bilateral.

In æsthesioscopic investigations we should remember the blood supply of the organ. If we believe we have to do with uterine disease, for example, and find, in agreement with this, marked bilateral sacro-lumbar reflex anæmia without accompanying epigastric cutaneous anæmia, attention should be directed to other organs which may cause corresponding lumbar anæmia without associated epigastric cutaneous anæmia (e.g., rectum and certain of the aortic segments). But if the actual organ has been detected, and it is further desired to find the segmental level, the fourth rule must be made use of, that is to say, we determine the segmental position of the lower edge, and thus ascertain the place of origin of the pain.

We must remember that many organs may be situated at the same level as regards the afferent segmental innervation. If we find, for instance, reflex anæmia of the shape and position of that shown in *Fig. a-d-e*, we know that it corresponds to that found in cholelithiasis; but high level duodenal diseases, aortic diseases of the same segmental level, and probably pancreatic diseases can cause exactly the same reflex anæmia. On the other hand, if we find it corresponding to *Fig. a-d-g-e*, we can conclude with certainty that the pain is not due to biliary colic, since the reflex anæmia caused by the latter, irrespective of the degree of the pain, does not reach below the line joining the tips of the two 9th ribs (line *d-e*).

The determination of the level is important (1) in the localization of the seat of the pain when diseases of the organs with long lumens are concerned (digestive canal, ureter, aorta), and (2) for identifying the organ itself, since by æsthesiосcopy we determine the segmental position of the disease, so that we can discover which organs belong to the zones in question.

As a guide for this purpose the table below is given, which also records the afferent segmental innervation of the organs as determined by the æsthesioscopic findings.

(It must be emphasised that the lower border is the important one. The upper border is less definite, probably because every part of an organ is innervated from more than one segment. Uncomplicated appendicitis is thus frequently accompanied by hyperalgesia spreading over two or three segments, gradually becoming indefinite in a proximal direction, presumably because the tracts are chiefly incorporated in one principal segment, but as the number of fibres decrease they become connected with adjacent segments.)

LOCALIZATION OF THE AFFERENT SEGMENTAL INNERVATION OF THE VARIOUS ORGANS.

Trachea.	.	.	.	3rd dorsal segment to 6th cervical segment.
Bronchi.	.	.	.	6th dorsal segment to 2nd dorsal segment.
Bronchioles	.	.	.	9th dorsal segment to 6th dorsal segment.

Alveoli	12th dorsal segment to 9th dorsal segment.
Distal end of oesophagus	7th dorsal segment to 5th dorsal segment.
Stomach	8th dorsal segment to 6th dorsal segment.
Biliary passages	9th—8th dorsal segment to 7th—6th dorsal segment.
Small intestine	11th dorsal segment to 9th dorsal segment.
Ascending, transverse and descending colon	12th dorsal segment to 10th dorsal segment + 8th to 6th dorsal segment.
Sigmoid flexure	3rd lumbar segment to 12th dorsal segment.
Rectum	5th sacral segment to 12th dorsal segment.
Prostate	2nd—1st sacral segment to 12th dorsal segment + 9th to 6th dorsal segment.
Uterus	2nd—1st sacral segment to 12th dorsal segment + 9th to 6th dorsal segment.
Fallopian tubes	1st lumbar segment to 12th—11th dorsal segment + 9th to 6th dorsal segment.
Heart	7th dorsal segment to 4th dorsal segment.
Aortic arch	2nd dorsal segment to 6th cervical segment.
Celiac artery	9th dorsal segment to 6th dorsal segment.
Superior mesenteric artery	12th dorsal segment to 10th dorsal segment.
Inferior mesenteric artery	3rd lumbar segment to 11th dorsal segment.
Spermatic artery	9th dorsal segment to 7th dorsal segment.

(As the 4th cervical segment to the 2nd dorsal and the 1st lumbar segment to the 5th sacral are not represented in front, or at any rate only by rudimentary zones, the determinations in the case of these segments are made from observations of reflex anæmia on the back.)

These are the chief facts we must bear in mind when we wish to determine the seat and origin of visceral pain from a study of viscerocutaneous reflex anæmia. It must be emphasized that these investigations are only applicable to localization; they reveal nothing of the *nature* of the causative disease. Applied with discretion, the method can undoubtedly yield more reliable information about the seat of visceral pain than any method of sensory investigation hitherto used, because the principle of the method is to observe and interpret the affected organ's own sensibility, expressed as it is by the viscerocutaneous anæmic zones.

THE NERVOUS CHILD.

BY R. G. GORDON, BATH.

THERE is an aspect of the study of the nervous child which is worth considering, although it is necessarily highly speculative, and that is the psychological and physiological basis of his mental peculiarities, for unless we have a policy to guide us our treatment will be empirical and haphazard. Such haphazard and discontinuous treatment will defeat the end in view to a greater extent in the case of the nervous child than in any other branch of therapeutics. If a child is brought to us because his attitude to life is not normal, we must not only inquire how he behaves, but also ask why does he behave in this way. To answer this last question there are three lines of inquiry which may be followed up: (1) What initial equipment did he start with—what was his predisposition? (2) What has been and is the influence on his mind of his bodily functions, the secretions of his ductless glands, the efficiency of his digestion, renal function and so on? These are questions of temperament. (3) What have been and are the outside events which constitute his experience? In answer to the first question, from the psychological point of view, we may follow the arguments of McDougall¹ and Shand,² and postulate that the child is endowed with certain innate dispositions having the character of instincts and presenting for our examination a cognitive, affective, and conative aspect. McDougall has enumerated these, describing seven well-defined instincts of flight, repulsion, curiosity, pugnacity, subjection, self-assertion and the parental instinct, four less well-defined instincts of sex, gregariousness, acquisition, and construction, and the general innate tendencies of sympathy, suggestion and imitation, which are the affective, cognitive, and conative aspects respectively of the same tendency.

He then argues that the influence of temperament and environment working on this given material builds up the compound emotions, the sentiments and the character as a whole. Although these units of McDougall are capable of being connected with lower level processes, and are by no means unanalyzable as he claims, they serve as a useful starting point for psychological discussion. Suppose for a moment we consider this disposition as we would a prescription and think of the mental equipment of a child as consisting of so much pugnacity, so much curiosity, so much sex and so on. It must be admitted that at present we have no means of evaluating these dispositions in a

quantitative way, yet observations of the behaviour of different children will give us a rough idea of how these units are proportioned. There can be no question that they do vary relatively to each other in different individuals and that this variation occurs within fairly wide limits. It is quite clear that one little boy has more pugnacity than another, while a third may have more curiosity, and so on. But within the limits of what is called 'normal,' this variation is as a matter of fact restricted, and no one instinctive unit can find expression entirely out of proportion to the rest. The nervous child is the child who does not achieve adaptation to his environment in the various stages of his growth. The individual cannot be studied apart from his environment, and his growth is or should be like the ever-widening circles caused by the disturbance of a still surface of water; as Janet³ puts it, his individual development should be commensurate with the increasing radius of his activity. Freud has laid stress on how this growth may be lopsided and how certain elements in the individual's character may be checked in their development by repression, and, remaining as infantile communities in an adult state, disturb the asymmetry of interaction between the individual and his environment; moreover, neurotic symptoms are definitely traceable to this asymmetry of growth. In some cases it is possible to discover that this asymmetry started at such and such an age as a result of such and such an experience, or the realization of some physical defect. The more we study these cases the more convinced we become, that although such incidents or the recognition of such defects may be the last straw that broke the camel's back, in many, if not in most, we have to trace this asymmetry right back to the innate dispositions, and I believe that many children are nervous because of a want of due proportion between their innate tendencies. To get back so far as this with any degree of clarity or certitude is extremely difficult in most cases, as any given personality, even that of a child, is a very complex affair. But, although we cannot estimate the proportions of the various elements with any precision, we may recognize in the nervous child behaviour which depends on combinations of these, which is not precisely similar to the behaviour induced by similar combinations in the so-called normal child. McDougall has analyzed the more complex emotions with great skill, but, as Lloyd Morgan⁴ has pointed out, he has not perhaps laid enough stress on the emergent quality of the resulting combination of these simpler factors. This conception of emergence is one which is likely to be of great service to psychology. It is not, in fact, new, but is only just being drawn out from the shadowy realm of academic philosophy. The point is, that it is not enough to analyze the factors operating in the various functions met with throughout the universe. We have to postulate some new quality which emerges as the result of combination. This is familiar in the realm of chemistry,

where a mixture of hydrogen and oxygen under certain environmental conditions results not in a simple mixture, but in a new individuality, water, which has all sorts of unique properties totally different from its derivatives. Lloyd Morgan, in his Gifford lectures, showed how the same law holds in the realms of life and of consciousness, and we may apply it for our present purpose. McDougall states that such an emotion as awe is made up of fear and self-abasement and curiosity, but he leaves out of account the new quality which emerges from the combination of these primary emotions. No doubt self-abasement, curiosity and fear do go to make up awe, but awe is not just a mixture of these; it has a quality of its own which belongs to none of them. Further, the important point in the present argument is that it by no means follows that a compound of these ingredients will always emerge the same. Returning to the analogy of chemistry, this is at once obvious. The emergent depends on the proportion of the ingredients and on the environment at the time of formation of the compound. For instance, take chlorine and mercury—under certain circumstances we get calomel, and under other circumstances corrosive sublimate. So in the integrations of the simpler mental patterns into the more complex emotions and sentiments sometimes one emotion emerges and sometimes another. For example, a typical nervous child was strongly endowed with curiosity—she was always prying into forbidden subjects, especially sex; strongly with fear—she would do nothing that threatened herself in any way; though not a bad swimmer, it was all that her governess could do to induce her to enter the swimming bath; and strongly with self-abasement, for she was slow and rather backward, and could not keep pace with other children. However, there was certainly no awe developed in her: on the contrary, rather an aggressive type of behaviour was complained of by her elders. This aggressiveness was, no doubt, compensatory to hide from herself her real self-depreciation, and it may be said that there was no development of awe because there was no integration of the simpler emotions. This is to a certain extent true, and is important, yet there was an integration of sorts into a sly attitude towards things to which it is difficult to give a name; this I would regard as an emergence of a different type from awe, though composed of the same essential ingredients. In respect of the nervous child this factor of want of integration is an extremely important one. As an illustration, a boy of twenty was sent into hospital for supposed chorea. The history was that he had all his life been a nervous child, an only son and his mother's darling. It was very soon obvious that there was no real chorea, and that the boy was a typical mental defective, with bodily deficiencies as well, such as kyphosis. He had only reached Standard II. at school, and exhibited the common lack of emotional and motor control often seen in such cases. In this case, then, there

was a complete lack of integration and control, and he perhaps ought not to be included as a nervous child, but the parents seemed quite oblivious of there being anything wrong except that the poor boy was always 'so nervous.' It by no means follows, however, that the nervous, non-adaptable child is always backward: indeed, many such children are more than usually bright. For example, take the case of a boy of eleven. He was the despair of his aunt, who had brought him up since his mother's death, when he was three years old. He got on unusually well with his lessons when he would stick to them, but he was quite incapable of settling down at school, as he refused to obey his superiors or adapt himself to the other boys. At home he was worse, for he would not obey any one and would not stick at anything for long at a time. He was described as highly strung and nervous. There was no opportunity to go closely into his case, but he obviously had excessive curiosity and pugnacity and apparent self-assertion, though this might have been found to be a cloak for a real self-abasement had a fuller investigation been possible. Such ingredients might have been expected to produce ambition, but this was strikingly absent from the boy's personality. The reason for this may well have been the falsity of his self-assertion, but the most striking factor was the lack of integration of his whole character.

So far these features have only been described in psychological terms: can we get any idea as to what underlies them if we consider them from the anatomical and physiological standpoint? To do this we have to go back to the basal unit of the reflex arc, which is built up and integrated at higher and higher levels, as Sherrington⁵ has shown. But, as Holt⁶ pointed out, it is not the individual neurones or the separate reflex arcs which are important, but the way in which these are arranged; it is that arrangement which constitutes the physiological basis of the human soul. Similarly, it is not so many wheels and rollers that make a printing press, but the arrangement of these wheels and rollers in a definite specific way: the essential feature of a printing press is the 'form of organization of the wheels and rollers.'

Most people do lip service to the theory that arrangements of neurones are in correlation with every mental process, but they are usually content to leave it at that, though McDougall emphatically repudiates any such method of approach to the problems of psychology. As it is impossible to observe a mental process going on in the neurone, the best we can do is to formulate a policy which seems to explain the facts, always being ready to throw it over when we get a better one. So far the most promising policy to follow would seem to be the mnemonic theory of Richard Semon.⁷ Because he has invented a new vocabulary to express his concepts many find his view repellent, but in reality it is all clear and simple. His conception is that there are certain dispositions

laid down, both in the germ cell and in the bodily structure of the individual. As a result of these dispositions, which he calls engrams, development and behaviour tend to follow certain definite lines. They are, however, capable of modification. They respond to certain patterns of stimuli by reason of the selective power of the receptors to which each corresponds—a familiar example being the tree, which puts out leaves every spring in response to atmospheric stimuli and its own inherent type of behaviour. These leaves are similar, but not identical to those of the preceding spring. Appropriate stimuli are followed by activation of the engrams, but after a state of quiescence is again reached the state of the engram is not the same as before. Hence, though revivals tend to be similar, they are never identical. When evolutionary progress has reached the stage of a complicated nervous system, certain engrams may be postulated which consist of special groupings of neurones with mental processes in correlation. The same mnemonic laws apply to these, and although the same underlying type of behaviour results from the stimulation of these engrams, new groupings and integrations may occur, and by correlation new types of behaviour arise. The greater the multiplicity and complexity of neurones, the greater will be the potential modifications of engrams and the greater the elasticity of behaviour. Obviously it is in the human being that such potentialities reach their maximum, but modification of engrams and the correlated elasticity of behaviour are quite useless unless integration is possible into composite groups of engrams whose correlated behaviour is adapted to the needs of the individual in relation to the environment. It is just in this respect, as has been seen, that the nervous child fails. Why so? What part of the nervous system is concerned with this higher integration of engrams which results in the proper correlation of behaviour so that it is adapted to circumstances, and controlled? In the realm of motor activity, Hughlings Jackson and his followers have shown that adaptation and control are the function of the precentral cortex. Similarly, in the realm of sensation, Head⁸ had shown that the same functions are subserved by the postcentral cortex. More recently Bianchi⁹ has shown that the frontal lobes have the same function with regard to the so-called emotional reactions or instinctive dispositions of McDougall. He subjected certain monkeys to ablation of the frontal lobes and carefully observed their behaviour over long periods. Amongst other features observed, he notes that “none of the monkeys operated upon has shown the existence of that regulative and inhibitive power which it possessed prior to the operation. . . . The defect that is most outstanding consists in the entire absence of the higher sentiments, which represent a complication of the primitive emotions with numerous new factors. The sentiments of friendship, gratitude, jealousy, maternity, protection, dominion, authority, self-esteem,

ridicule, and above all that of sociality—all these disappear after mutilation of the frontal lobes, whilst the primitive emotions remain sometimes even intensified, but not adapted for the struggle for existence. In all cases the conduct is seen to be incoherent. This incoherence is due to defect of imagination and of memory, to incapacity to represent and sustain an objective in the focal point of consciousness. The whole psychic tone is lowered . . . and attention must be directed to the stereotypies and ties which are often met with.” If Bianchi is correct in his interpretation of the functions of the frontal lobes, then there can be no doubt that integration of emotional dispositions depends on the proper working of this part of the nervous system. McDougall and Shand have shown that character and personality are built up on these emotional dispositions, and I have indicated that it is here that the nervous child fails. We must presume, then, that there is something the matter with his frontal lobes. That this is nothing gross is obvious, for the nervous child is not lacking in capacity, and frequently ‘grows out of’ his nervousness and becomes a normal and useful citizen. I would suggest that there is no deficiency of frontal neurones, as is the case in the idiot and imbecile, but that these do not get integrated into the requisite engrams. There is, to use Janet’s old expression, a lack of psychological synthesis, a failure of the synapses to get together. Such terms are, however, merely descriptive, and an explanation of the failure of integration is more difficult. In my opinion there is no one law to cover all cases. It must be remembered that at the level of the frontal lobes we are dealing with the most recently acquired and, consequently, most easily disturbed and delicately adjusted structures. To use a hyperbole, at spinal levels a crowbar is needed to disturb function : but at frontal lobe levels an angry word is all that is required. To say that the nervous child lacks the normal inhibitions is almost equivalent to saying that he lacks normal integration, for all evidence, both psychological and neurological, points to the fact that inhibitions are especially imposed by higher functions on the exuberant manifestations of lower activities. Witness the effects of removal of cortical control in liberating convulsive seizures in the motor realm or in the sensory realm, the unrestrained affective reactions when the thalamus is liberated from cortical influence. Bianchi suggests that inhibition depends, at any rate to some extent, on the length of the path which has to be traversed before the final motor path is reached, and so any short-circuiting which may occur will reduce inhibitions. I think this view of inhibition must be taken with a certain amount of reservation, but it is certainly suggestive that a cutting out of the frontal lobes with all their intricate neurone paths does result in the most remarkable diminution of inhibitions. Why, then, should these frontal neurones fail in their function to exert control over the rest ? In certain cases, such

as the congenital psychasthenies described by Janet,¹⁰ there is something inherent which prevents integration. What that is we have not the slightest idea. In other cases nutritive deficiencies, lack of vitamins, etc., seem to be responsible, for when these are remedied improvement occurs. This is more noticeable in young children, whose nervousness is manifested in fits of temper and screaming, and sometimes in faints or fits. As illustration, I may take the case of a child aged nine, whose mother stated that he suffered from fainting attacks, uncontrollable temper and a general nervous attitude towards life. The stools showed undigested fats, and liver efficiency was reduced. Reduction of fat in the diet, with a more generous provision of vitamins, resulted in a much more normal behaviour, and eventually in apparently complete recovery.

Various poisons and infective agencies are frequently responsible, and those of syphilis and encephalitis are specially noticeable in this respect.

Finally, similar results may ensue, as Freud and his followers have shown, if the child is placed in an environment in which circumstances reacting on his personality make for conflict between various emotional dispositions instead of making for their integration. I am convinced that this environmental factor is of great importance and should never be lost sight of, and that unfortunate family frictions and unbalanced attachments to parents are more prejudicial to the normal development of the child than anything else.

In any case, whichever line of approach is taken, there is a tendency to try to dissociate the individual from his environment for descriptive purposes, but this is misleading, and it cannot be too often reiterated that a personality is meaningless except in relation to his environment. This error is specially liable to occur amongst those who approach the subject from the neurological standpoint, and must be carefully avoided.

Let it not be thought that because we try to express the pathology of the nervous child in terms of neuropathology rather than in terms of psychopathology, this means that treatment is less called for or less likely to be successful. The higher the level the more easily is function disturbed, but also the more easily is it restored. All neurologists are familiar with the possibilities of re-education of cortical function in the motor realm, where irreparable destruction has not been too extensive. Careful experiments by Graham Brown and Stewart¹¹ have shown how cortical function may be restored in the sensory realm by re-education, and less exact observations indicate the same possibilities in the experience of most workers. Still more, then, is it possible to modify and improve the functions of the frontal lobes, and much can be done in most cases provided care is taken to discover exactly what is amiss, which dispositions are disintegrated and out of control, how this dis-

integration came about or what influence is preventing the due development of the personality. For this purpose a certain amount of analysis is essential, though the complete psychoanalytic procedure is seldom, if ever, necessary or advisable, the risk of making the child too introspective at an age when he is incapable of discriminating values being too great. But if psychological investigation is important, so is adequate physical examination, for one has known of cases in which many hours and much labour have been lost in futile or almost futile psychological analyses when attention to a physical defect, such as eye-strain, or deafness, or a digestive abnormality, was all that was necessary to change the course of the child's existence.

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THE RÔLE OF TRAUMA IN THE ETIOLOGY OF ORGANIC AND FUNCTIONAL NERVOUS DISEASE.*

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INTRODUCTION.

THE subject of the possible causal relation of trauma to the development of organic and functional nervous disease is thorny and difficult, yet of first and ever-increasing importance. It concerns the general practitioner fully as much as the specialist, if not, indeed, more. There must be scarcely any medical men who have had experience of the question of trauma in compensation cases but are able to quote decisions in law which have been admittedly unsatisfactory from a medical and scientific point of view. The reason is that medicine is not an exact science, at least by no means wholly so, hence we must expect (1) great variety of opinion, and (2) occasional conflict of medical evidence. I say occasional, yet when, in reality, has a case involving the question of trauma come before the courts in which medical men have not appeared to be diametrically opposed to each other? One can understand differences in opinion and in interpretation, but how can we reconcile differences in observed facts? Too often has this medical conflict provided material for the cynic; too frequently have the representatives of our profession allowed themselves to be influenced, not by the objective medical facts of a case in dispute, but by the standpoint of the particular side on which they happen to be called. A man famous in the Edinburgh medical school of the middle of last century was Sir Robert Christison, the medical jurist, and of him Lord President Inglis, the greatest Scottish judge of the same period, said: "The Professor went into the witness-box not in the spirit of a partisan, but in his proper office as a medical jurist, to aid the court and the jury in the elucidation of truth, and in securing the ends of justice." Were this, the ideal attitude of the medical and scientific witness, adopted more generally, there would be fewer unseemly disagreements on the part of those of us who are asked to express medical opinion in court cases.

In fairness, it must be admitted that the absence of authoritative

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medical pronouncements in the matter of trauma is greatly to be deplored. There is no body or compendium of medical doctrine to assist the medical witness and, through him, the court. There is no unanimity in respect of terminology and definition. The least experienced and least knowledgable medical man may find the same weight attached by the court to his evidence as to that of others much better able to express considered views. For the guidance of the profession, for the attainment of some semblance of accord, opinion expressed by a commission of accepted experts is the first desideratum. Contradictory statements cannot be avoided unless and until the physician has a thesaurus of neurological doctrine to which he may turn and from which he may learn.

The extreme importance of the subject is evidenced by the enormous amount of litigation to which it gives rise. The total of money involved is almost incredible. According to figures recently given in the *Lancet*, quoted from a book by J. L. Cohen on 'Workmen's Compensation in Great Britain,' the "total cost to the country of accidents and industrial diseases is from 36 to 48 million pounds a year," a colossal if in any way approximate figure. Litigation is incessant. Cases are constantly being taken up as a speculation by the less reputable kind of legal man, while it need scarcely be said, as long as human nature is as it is, efforts will be directed to making capital out of infirmities. Erichsen, whose right to speak with authority none ever denied, declared that "an extensive experience in railway accidents will probably impress the observer more with the ingenuity than the honesty of mankind." As we shall see, and as I shall be able to prove by figures, the greater the chance of remuneration the higher the percentage of 'accident' cases.

WHAT CONSTITUTES AN ACCIDENT?

Trauma has been defined as "an abnormal condition of the body caused by external injury"; an accident, as "injury by some unexpected and external event." The original (English) Workmen's Compensation Act of 1897 was silent as to disease: the cases coming under it were defined as constituted by "personal accident arising out of and in the course of the employment" of the individual concerned. The Amending Act of 1906, however, included certain scheduled diseases arising out of the employment, such as lead, mercury, and phosphorus poisoning, miners' nystagmus, telegraphists' cramp, and many other ailments. These are all now regarded as morbid conditions for which compensation is due. From the legal point of view, therefore, in respect of workmen's compensation, the distinction between accident and disease is vanishing. I need scarcely indicate how unsatisfactory this is from the medical point of view, and how it tends to etiological confusion. A few legal decisions may be quoted by

way of illustration. A wool-sorter contracted anthrax, and this was held to be an 'accident' arising out of employment; the 'accidental alighting of the bacillus in the eye' was taken to be equivalent to the accidental squirting of molten metal or some poisonous liquid into the eye. Owing to the breakdown of a pump a miner had to stand in icy cold water for some hours; pneumonia supervened and led to death, and this illness was considered an 'accident' arising out of employment. On the other hand, a fever hospital attendant developed scarlet fever, but failed in his claim for compensation due for this 'accident,' because he could not prove a definite association of his illness with his employment. Again, a workman inhaled sewer gas and developed enteritis; he claimed that his inhalation of the bacillus was an 'accident,' but the court held that sewer gas was not unexpected in a sewer, and the claim failed. I know of a case in which a man fell off a ladder when at work and developed a hemiplegia: medical evidence showed without any question the case was in reality one of encephalitis with hemiplegia, yet it was held to be an 'accident' that the 'germ' of encephalitis attacked the man while he was working.

If, then, these and similar illnesses are to be accounted 'accidents' within the scope of the Act, etiology becomes meaningless. It can always be maintained, apparently, that the arrival of pathogenic organisms in the tissues of the body is an 'accident' arising out of external injury, and our ideas on causation are, at a stroke of the legal pen, rendered obsolete.

WHAT IS MEANT BY THE CAUSE OF A DISEASE OR MORBID CONDITION?

As medical men, we believe in the doctrine of specific causes. We know the rules laid down by Koch in regard to the bacteriological origin of certain diseases. It may be taken as a good general rule—the more apparent causes for a disease, the less likely is any one of them to be specific. As a single illustration, take disseminated sclerosis. Because we do not yet know its actual cause, etiological speculation has ranged, as a fact, from the inhalation of pollen to an *affaire du cœur*. Once the cause is discovered—we may be near it at last—these varying hypotheses will all go by the board.

The whole tendency of modern research is oriented in the direction of specific causes, both in nervous and mental disease: hence it is shown from time to time that many 'causes' are clearly spurious. No one now but believes that syphilis is the essential and adequate cause of tabes and of general paralysis. Nevertheless, we continue to suppose that some factors, not truly causative, are contributory. We suppose that the mere arrival of the spirochæte in the neuraxis is not sufficient; we are taught that strain, stress, exposure, chill, other

infections, trauma, etc., cause the specific organism to 'light up' by reducing resistance, but such views are often unsatisfactory and always more or less speculative. In any case, it introduces an element of confusion, in my opinion, to claim such factors as contributory causes, since in innumerable instances the diseases mentioned develop without any such additional etiological elements. Neurosyphilis is no more and no less an infective condition than typhoid, pneumonia, diphtheria, dysentery, etc., but I am not aware that—to take the factor that now concerns us—typhoid or dysentery is ever considered traumatic in the sense in which the term has been applied to cases of neurosyphilis. For none of these infections will we consider trauma a cause, in the real meaning of the word, and there is no reason why the same argument should not apply to an infection of the nervous system.

In the case, therefore, of organic and of functional nervous disease, we ask ourselves whether the *rôle* supposedly played by trauma has not been greatly exaggerated, whether there is not a true cause for tumours and degenerations as there is for the infections to which the nervous system is liable, and whether there can be any real differences, etiological speaking, between nervous disease and that of any other of the somatic systems. Do we hear as much of a blow on the chest producing bronchitis, of a blow on the abdomen producing appendicitis or malignant gastric disease, as we do of a knock on the head causing a stroke, epilepsy, cerebral tumour, or what not?

I have never been able to understand why it is alleged so persistently of the nervous system in particular that trauma initiates morbid neural processes, and can only imagine that our ignorance of much of nervous etiology gives rein to speculation in a way scarcely applicable in respect of other parts of the body.

I do not, of course, attempt to deny for one moment that accidents, such as a fracture of the skull, a fracture-dislocation of the spine, wounds and penetrating injuries of many different kinds, will give rise directly to organic nervous symptoms: I am on the present occasion restricting myself to nervous disease in the ordinary acceptance of the term, and I maintain that, in proportion as etiological knowledge augments, such disease will be ascribed with less and less frequency to trauma as a *vera causa*.

TRAUMA IN ORGANIC NERVOUS DISEASE.

1. **Cerebral Tumours.**—Cerebral tumours are often attributed to blows on or other injury to the head. In his monograph on the subject, Mendel cites four personal cases and two from other sources, in which the question of a possible connection between a head injury and the development of an intracranial neoplasm arose. None of them is entirely convincing, though they are quoted as fulfilling the rules laid down by

that author as follows : (a) the individual concerned must have had no symptoms before the accident ; (b) other etiological factors must be awaiting ; (c) the injury must have involved the head itself ; (d) a certain relation in time (not specified) must exist between the injury and the commencement of the tumour symptoms, which subsequent operation or necropsy must not prove to have been erroneous.

Fortunately, the recent war has provided us with an experiment on a colossal scale, since in its course head injuries have occurred by the thousand. It is already nine years since gunshot wounds of the head began to come under my professional notice, and I have been seeing such cases ever since, as have many others. Abundant time has elapsed for the appearance of consecutive intracranial neoplasms, yet out of very many scores of personal cases I have never seen a single instance. The only practical conclusion is that the assertion that trauma may originate cerebral tumours is unjustified and obsolete.

A recent case from civil life may now be given :

A male adult, a labourer by trade, one morning fell some 2 feet only on a scaffolding, and landed across a plank, which bruised the inside of his left thigh at its upper part. He was shaken, but resumed work an hour or two later, though in the afternoon he felt sick. The same evening he had two fits, which were definitely right-sided and Jacksonian in character, beginning in the right side of the face, and temporarily interfering with speech. Progressive weakness of the right side ensued some weeks later, and after about three months he was admitted to hospital under my care, when the general symptoms of cerebral tumour, and the localising ones pointing to a left fronto-rolandic site, were definitely present. Operation was undertaken, but the patient's condition was not improved, and he died shortly afterwards. At the necropsy a left frontal glioma was found, occupying mainly the posterior ends of the second and third frontal gyri.

The widow sued the employers for compensation, asserting that the tumour was caused by the fall of 2 feet on to the crutch. In court two medical 'experts' declared that a fall on the coccyx might by concussion and dispersion of spinal fluid cause or initiate a morbid neoplastic process in the brain, but were unable to cite any experience objectively proving their speculation. On behalf of the employers I gave the argument from war experience as indicated above, and had the satisfaction of finding that the court appreciated the force of the contention.

2. *Disseminated Sclerosis*.—Trauma is not infrequently stated to be one cause of disseminated sclerosis, but since all the present available evidence suggests that the disease is infective in origin it cannot possibly be assigned to trauma, in the sense of external injury. It is gratifying to find in the recent investigation of this affection by the Association for Research in Nervous and Mental Diseases that Dr. Lewellys F. Barker excludes trauma as a true cause, though he says injury may on

occasion 'light up' a latent case, or exacerbate one that is already manifest.

The evidence of the war, further, is quite opposed to any traumatic etiology. At Fulham Military Hospital, of some 900 consecutive neurological cases seen by me from 1916 to 1918, only two were examples of disseminated sclerosis, and in neither had the patient been wounded, or blown up or gassed, or undergone any other injury. The relative rarity of cases of the disease during the war has already been commented on by more than one observer, yet nervous trauma was extremely common. Since 1919 I have had charge of a pensioners' clinic at the National Hospital, Queen Square, London, and hundreds of cases of war nervous disease have passed through my hands. Among these have been only six cases of undoubted disseminated sclerosis, and of the six the following are the only two where a possible connection with trauma comes up for consideration.

F. R., fighting at Cambrai in 1917, was blown up and gassed at the same time. He had no mask on at the moment, was badly burned over the back, and was unconscious for a brief period. Three months later, when in a military hospital in England, he began to notice unsteadiness in his legs, and to have some slight defect in articulation. The legs became numb and cold for a time, but he had no bladder difficulty. When he came under observation in 1923 he showed the usual symptoms of disseminated sclerosis in moderate degree.

While there is no history of any previous symptom, and no evidence of the action of any other factor than that of trauma, it is clearly inadmissible to hold that trauma caused the disease: the most to be said is that it may have 'lit up' a latent morbid process. In hundreds of instances of identical trauma (gassing and concussion) no such organic disease has made its appearance.

W. S. was in the R.A.F. during four years of the war. He had crossed the English Channel some 200 times in the course of his flying experiences. Later, towards the end of the war, he was shot down in air-fighting on three separate occasions, sustained numerous minor injuries apart from the shock of crashing, but was never rendered unconscious. Four months after the last of these, he first complained of double vision and of tremor in the limbs. On his coming under observation in 1923, the symptoms and signs of disseminated sclerosis were exhibited in moderate degree.

Here, again, it must be allowed that the injuries, such as they were, can at the most have done no more than possibly accelerate the development of the disease; it might, indeed, be contended with perfect justice that they played no part at all in its evolution.

In view of the rarity of the disease amid the welter of war injury, one is naturally more than ever disinclined to allow its association with

trauma in civilian life. Nevertheless, as every neurologist must know, such cases make their appearance at intervals. Two personal instances may be selected by way of illustration.

N. B., a young woman in domestic service, was cleaning a large and heavy mirror over a mantelpiece when it somehow became detached and fell on her right forearm, breaking as it fell. She felt a good deal of pain in the arm, which was bruised but not cut. In the course of a day or two numbness followed the pain, and weakness of the muscles of the hand and forearm. The case was diagnosed as hysterical dropwrist by the doctor under whose care she came, but as the condition, though improving, did not clear up entirely, I saw her some six months after the accident. I was then struck with the fact that, on grasping, the wrist deviated unmistakably to the radial side, indicating relative weakness of the ulnar groups—an organic symptom. The patient was put on steady treatment and kept under observation. Some six months later an extensor response was obtained on the right side, and three months afterwards on the left. In a word, the subsequent course of the case proved the disease to be disseminated sclerosis.

I will admit candidly that in this case I have always felt hesitation in excluding the *rôle* of the initial trauma, for the condition continued without a break to the development of definite organic signs, yet here also it is impossible to believe that a single trauma of the description given can by itself cause a progressive nervous, disseminated disease. That scattered islets of sclerosis of a quite peculiar kind in the neuraxis can be *caused* by a blow on the forearm is a proposition which cannot be entertained. Nevertheless, if we dismiss the hypothesis of mere coincidence, we are compelled, in fairness, to suppose that a latent organic nervous disease was 'precipitated' by a relatively severe peripheral injury, incapable though we may be of framing any reasonable theory as to how such an injury might act.

I was consulted not long ago in the case of another young woman who happened to be sitting in a public restaurant when part of the metal framework of a revolving electric fan on a shelf above her became detached and fell on her head from a height of about 6 feet. She undoubtedly received a severe shock and fright, was dazed and faint, and later on in the day was sick. She was at no time unconscious, but complained of much headache and giddiness. Her hat had kept her head from being cut, and there was no obvious evidence of direct injury.

When she was seen in consultation some weeks later she presented unequivocal signs of disseminated sclerosis! This was surprising enough. The case, fortunately, was settled out of court, for as the girl declared she had been perfectly well up to the time of the accident, it would have been impracticable to dissociate it and the symptoms she complained of when examined. Nevertheless, medically and scientifically speaking, it would be impossible to prove that, in the absence of other etiological factors, the injury caused the disease.

This latter case aptly illustrates the difficulty confronting the physician, since as the patient was not examined by a neurologist before the accident we do not in fact know that objective signs could not then have been found; further, when monetary compensation looms in view, it is a trait in human nature to suppress anything which might tend to reduce the amount; and again, as spontaneous remissions occur in the disease under discussion, so do spontaneous exacerbations.

3. Neurosyphilis, including Tabes and General Paralysis.—For years controversy has raged on the question of tabes and general paralysis arising from or originated by trauma, but not, I venture to think, quite so much now as in the years before the discovery of the spirochaete in the cortex and the spinal fluid of neurosyphilitic cases. Various cases are on record, however, where an apparent connection between trauma and the appearance of symptoms of general paralysis, for example, is sufficiently impressive.

In the absence of spirochaetal infection no one, I suppose, will now admit that trauma *per se* can cause neurosyphilis in any of its manifestations. Can it actually initiate a morbid process on the part of the spirochaete, in the sense that the latter otherwise would have remained for ever latent and innocuous? Put thus, the question can scarcely be answered in the affirmative, yet who shall say that a direct negative represents the only possibility? It is the sort of question difficult either to prove or to disprove. Take a recent case.

A guard on one of our English railways was apparently in normal health, in so far as ability to perform his duties was concerned, when his train, standing on the line, was run into by a second train, and he was knocked from one end of his van to the other. There were no visible signs of injury of any kind when he was examined the same evening, complaining of 'shock.' He resumed his duties very shortly after, yet within a month was found to be making mistakes, to be waving his flag wrongly, to be getting confused and incapable of explaining his erratic behaviour. Further precise investigation revealed the early symptoms of general paralysis, and within six weeks of the 'shock' he was under certificate in an asylum.

I submit that in this case we cannot say that the injury did anything whatever by way of aggravation of an already existing, but unrecognized condition, or by way of 'lighting up' a morbid process which was in abeyance. In view of the innumerable instances of the development of general paralysis without any trauma, we cannot suppose the speculation to have any degree of likelihood. In view, further, of the known remissions and exacerbations of the malady, the onus should rest on those representing the patient to prove, in a compensation case, that the condition was not due to an ordinary exacerbation from within. The modifications arising in the course of general paralysis are the result of intrinsic, not extrinsic, factors.

The so-called time factor is, doubtless, a somewhat elastic element in an alleged traumatic case. My contention is that unless it can be proven that a commencement of the symptoms of general paralysis, or of tabes, actually arises within forty-eight hours, say, of an accident, or that they are augmented within the same period, on the evidence of the same physician as has seen the patient on previous occasions, it is illegitimate to argue for a causal relation between accident and symptoms. In genuine trauma of the nervous system, do we not agree that the symptoms arise practically at once? Even in the case of delayed traumatic apoplexy, on which so much has been written of a contentious nature, is it not agreed that there is continuity of symptoms, however slight they be, from the very time of the injury? Since there must be some limit to the interval of time elapsing after an alleged injury ere symptoms appear, I suggest that in the case of organic nervous disease it should be restricted at the widest to one week. The neuropathologist is well aware that morbid histological processes make their appearance at a much shorter interval after a genuine trauma than one week.

4. *Other Organic Nervous Diseases.*—Time will not allow me to deal with other organic nervous conditions such as syringomyelia, progressive muscular atrophy, ascending neuritis, etc., in various clinical examples of which it has at one or other time been claimed that trauma has originated the process. The same claim has been made during the war in respect of traumatic dementia præcox and other forms of mental disease.

My general standpoint is that I am unable to understand how a single trauma can cause a progressive neural degeneration or abiotrophy, still less, of course, a progressive neural toxi-degeneration. The former appears to me a physical impossibility. We are ignorant, it is true, of what the 'span of life' of a neuronie system is in terms of biochemistry: we do not know under what circumstances the spinal degeneration of a Friedreich's case makes its appearance, but I am convinced we should seek the solution in the biochemical field of intrinsic neural 'life and death,' and not glibly assign progressive degenerative processes to the action of a 'shock'; even assuming a concussion so bad as to produce, on a small scale, fragmentation of myelin, we know, as a histological fact, that scavenging takes place very promptly and that neural regeneration is equally sure. This being so, the view that trauma may on occasion cause neural abiotrophy of a progressive character is in my opinion opposed to the facts of neuropathology.

TRAUMA IN EPILEPSY.

It has been asserted almost universally that trauma may cause epilepsy; I have never been able to understand why. Nothing is more

common than for the physician to be told that the epilepsy of his patient is the result of a fall from a perambulator or of some other blow on the head. Were this in actual fact the real sequence of events, then every child should be epileptic, for which of them has not at one time or another had a knock on the head? The persistence with which epilepsy is attributed by parents to a fall or blow on the head—often trifling enough, too—is amazing, in fact, it may be, of an overwhelming history of family nervous instability.

War is the great experimenter. In a recent communication Aldren Turner has given figures derived from the Ministry of Pensions in England. Of 18,000 cases of gunshot wounds or other injuries of the head occurring in warfare, some 800 patients have subsequently developed epilepsy, i.e., rather less than 5 per cent. The extreme importance of these figures will at once strike the reader. The percentage is approximately the same, according to Turner, as was observed in the Franco-Prussian War. Another set of figures is given by Holmes and Sargent; of 610 cases of gunshot wound of the head, observed from two to eighteen months after the injury, thirty-seven, or 6 per cent., developed epilepsy. This percentage, without doubt, is much less than might have been expected if trauma *per se* has in reality the effect too readily attributed to it by parents and, indeed, by many medical men.

By way of amplification, it should be remembered that thousands of individuals with severe war injuries to the head—with fractures of the skull, laceration of brain tissue, paralysis, and all the rest of it—have not developed epilepsy in any shape or form. I associate myself entirely with Turner when he insists that “it is difficult to avoid the conclusion that something more than local tissue alterations is requisite for the production of the seizures of traumatic epilepsy, and the determining agent, in my opinion, is an inherited or inborn constitutional predisposition to nervous instability and epilepsy.”

It seems difficult to come by statistics as to the family history and individual make-up of those soldiers who have suffered from traumatic epilepsy the result of war injuries; R. G. Gordon has obtained evidence of a neuropathic predisposition in 75 per cent. of his cases; in a series of my own, from the pensioners' clinic at the National Hospital, Queen Square, I have found similar evidence in 80 per cent.

We are not, therefore, justified in admitting more than that in a small minority of war cases of traumatic epilepsy the injury seems to have initiated the disorder in individuals previously healthy and unimpaired by heredity; in the great majority the existence of the constitutional factor cannot be ignored or explained away; finally, the percentage of epileptic production among the head-wound cases is itself so small that it is abundantly evident the predisposition is much more important than the head injury. So clear is this that we should

be chary of certifying that a head injury has 'caused' traumatic epilepsy in any single case; if the predisposition is obvious, its importance should be emphasized, and, only when we have exhaustively scrutinized the family record with a negative result can we allow trauma *per se* to be the *causa causans* of the condition. In this respect I wish to direct attention to the frequency with which asthma is reported in family histories otherwise supposedly normal.

A young officer in the army consulted me recently because of three 'attacks' he had had in the last six months. From the description given it seemed certain they were epileptiform in character. I found no sign of organic nervous disorder or of rise of intracranial tension. The 'attacks' were attributed by the parents to two tosses the patient had taken when steeple-chasing: in the first instance, he had fallen on the back of the head and been unconscious for two or three minutes. An *x*-ray examination showed no definite changes in the cranial vault. I was assured confidently that the family history was in every way normal, but on further questioning I elicited the fact that the patient's father had suffered from asthma for years, and so had a paternal uncle.

To my way of thinking this strain of neurosis was much more significant than the trauma, such as it was, and I cannot say that the latter caused anything at all. The interval between the second 'toss' and the first fit was several months. While it would be equally difficult to prove that the head injury had no connection with the subsequent fits, the conclusion is that the experiences of war cases must lead us to attach prime causative significance to the constitutional make-up of the individual.

TRAUMA IN FUNCTIONAL NERVOUS DISEASE.

When we approach the subject of the rôle played by trauma in neurosis-formation we enter at once on thorny ground. We find ourselves lost in the confines of a vast and inchoate group of morbid affections variously described as traumatic neurasthenia, traumatic neurosis, traumatic hysteria, etc. There appears to be neither etiological, symptomatological, nor even terminological agreement in respect of this class.

As a single illustration, we may select the question of spinal concussion. In a fairly long experience I have seen all sorts of conditions classed as spinal concussion, or, alternatively, as 'spinal irritation,' whatever the term may mean. It is well that those who give certificates to state that their patient has sustained spinal concussion should have a real idea of what the symptoms are and to what extent, once more, the war has assisted us in this connection. Concussion cannot heighten function; it must reduce or inhibit it. In cases of genuine

spinal concussion we find diminution or loss of power in the legs, with diminution or loss of the deep reflexes, involvement in greater or less degree of the organic reflexes (rectal, vesical, sexual), but with little or no impairment of sensory conduction. The plantar reflexes may be also abolished for the time being or may be either in flexion or in extension.

Corroboration of this clinical picture has been obtained experimentally by various workers, notably by Alan Newton, who made a series of experiments with Sir Victor Horsley in 1913, on cats and apes. The spinal theca was exposed by preliminary laminectomy, and on it were dropped, from different heights, various weights. So sensitive is the spinal cord when no longer protected by the vertebræ, that the effect of the dropping of a 50-gram. weight from a height of only 1 cm. was sufficient to abolish conduction in the cord. It produced no visible effect on the surface of the cord, yet, pathologically, small hæmorrhages were to be found usually in the basal region of the posterior horns or in the posterior grey commissure, with scattered swellings of axis cylinders and disintegration of myelin sheaths. Newton was able to show experimentally that sensory conduction may remain after concussion that has quite abolished motor conduction. Compression for short periods (two minutes or more), produced by gently placing a 50-gram. weight on the cord of a cat, brought about the same clinical and pathological result.

When, therefore, we speak of spinal concussion in connection with accident cases, we can only use the term advisedly if the clinical picture is approximately as above described. I venture to say that in many of the traumatic cases of civilian life, facetiously certified as spinal concussion, the diagnosis is erroneous.

A young man fell down a lift, some 15 or 20 feet. He was badly dazed but not unconscious, and by good luck no bones were broken. Taken to hospital, he was not detained: his reflexes there were noted as being present. He complained of pain in the back, at about the level of the last two dorsal vertebræ. Examined the same evening by his own doctor, and again the next day, his chief complaint was of this pain. Eventually he claimed compensation and was duly certified to have had spinal concussion and to be suffering from the effects of it—this was not less than about four or five months after the fall. When I examined him subsequently my *questionnaire* was directed to the points of importance outlined above, and I ascertained that there had been no reduction or abolition of power in the legs originally and no impairment of rectal, vesical, or sexual mechanisms. It was known, further, that the deep reflexes were active within an hour of the fall. In these circumstances I gave it as my opinion that there had been no spinal concussion and that therefore the patient could not be suffering from the effects of it.

If the injury is of so mild a character as not to give rise to recognizable signs of this character, we have at present no certain means of

detecting minimal degrees of commotion objectively. We do not know that they give rise to symptoms of a pathognomonic kind: we cannot point to any single, unequivocal, objective sign as of constant value. As far as my experience goes, I cannot distinguish an organic basis slight or minimal in degree from a non-organic basis in respect of motor weakness and changes in the reflexes, though it is usually simple enough to determine the hysterical or neurasthenic factors otherwise. Thus the statement that the knee-jerks, for instance, are 'exaggerated,' is valueless if it is thought to aid in differentiating between organic and functional cases.

There is, however, another aspect of the question which deserves fuller consideration than it commonly receives. Assuming a slight degree of spinal concussion or commotio, a moderate amount of myelin fragmentation, even minute hæmorrhages, we must not forget that within a comparatively short time this tissue-débris is scavenged away, while active regeneration is a normal reparative process. It follows as a definite histological fact that in slight or minimal degrees of spinal commotio any tissue-change in the organic sense that has occurred will vanish in due course and the cord be histologically normal again. But what of the patient's symptoms? What of the subjective complaints?

It stands to reason that the presumed effects of the spinal trauma having been countered by reparative processes, the cause of the symptoms is no longer in existence. Yet every clinician knows how months and years after a slight 'spinal shock' the patient will still complain of the same old pains, weakness, shakiness, and what not. It is obvious, then, that in many instances the condition changes definitely in the course of time; it is perpetuated by other pathological mechanisms than those originally implicated. If, to give the patient the 'benefit of the doubt,' we admit the possibility of mild spinal shock amounting to concussion, we are clearly prevented from allowing its effect to continue quite indefinitely. It is, in fact, actually the case that in innumerable instances the accident is recovered from, yet the symptoms remain. In Sir John Collie's words, such "claimants do not suffer from the accident but from the memory of it." It is the bounden duty of the medical examiner to insist that there is, in the cases of which I am now speaking, a time limit for the duration of any symptoms presumably due directly to minor spinal commotio. The conclusion to which consideration of all the circumstances drives us is that a neurosis supervenes, and that in the great majority of cases this is prolonged by (1) conscious and (2) unconscious motives.

That a process of this description usually occurs has long been recognized; the Germans speak of a 'Rentenkampfneurose'—a 'fight-for-compensation' neurosis. The war has shown us a thousand

times how the genuine effects of concussion, cranial or spinal, pass off eventually, with a complete return to the normal, but if they persist, in the absence of evidence of objective change, it may be taken as an infallible rule that the condition has ceased to be one of concussion.

1. **Conscious Motives.**—Possibly, some have a natural hesitation in admitting that human nature is so constituted as to be prone to make financial profit out of personal trouble, yet the fact remains. Every experience points in this direction. Let me give the figures of three recent railway accidents on one of our biggest English railway systems.*

I. Accident, January, 1915. Number of passengers travelling in the two trains that collided, 693. Number of deaths, 14. Number who actually received visible and obvious injuries, e.g., wounds, fractures, true concussions, 54. Number claiming compensation for 'shock,' 'neurasthenia,' etc., who were medically examined, 275. Number who claimed similarly on account of 'shock,' and whose claims were settled without medical examination, 180.

Total claims, 523, out of 693 passengers; total claims for 'nerve shock,' almost 66 per cent.

II. Accident, October, 1922. Number of passengers travelling in train, 73. Number of deaths, *nil*. Number of actual and visible injuries, 3. Number who claimed compensation for 'shock,' 'neurasthenia,' etc., 41.

Total claims for 'nerve shock,' over 56 per cent.

III. Accident, November, 1922. Number of passengers travelling in the two trains involved, 183. Number of deaths, *nil*. Number of cases of visible and obvious injury, 27. Number of claims for 'shock,' 'neurasthenia,' etc., 87.

Total claims for 'nerve shock,' over 42 per cent.

Taking these together, the average of three railway accidents, only one of which was severe, gives a percentage of 55 of those involved claiming damages for 'neurasthenia,' i.e., one in every two passengers apparently suffered from traumatic functional nervous disease. Can we seriously believe that every other individual taken at random is neurotic? During the war, millions of soldiers were submitted to precisely the same warfare, the same stress and strain, the same shell bursts, the same bombardments; did 55 per cent. of them develop 'shell-shock'? Every one knows that the percentage was far less than that. The only conclusion we can draw, I submit, is that in many instances conscious motives connected with monetary compensation have a great deal to do with the simulation and exaggeration of symptoms almost invariably noticed among patients reputedly suffering from traumatic neurosis. The question of money to be obtained colours the whole situation, as the railway figures quoted prove up to the hilt.

2. **Unconscious Motives.**—We may take the facts as stated by

* For these figures I am indebted to my friend Dr. Grant MacMahon.

other observers, whose authority will not be questioned. In the matter of miners' nystagmus, the recent Report published in England, and contributed to by the late Dr. W. H. R. Rivers, proves conclusively how potent is the unconscious motive (if it is in reality unconscious). Since the introduction of compensation, we learn that the prevalence of disabilities from miners' nystagmus has vastly increased: monetary considerations (for what other factor is there?) have led to the production and to the prolongation of disability to work.* Since the passing of the Workmen's Compensation Acts in England, functional traumatic cases have been ever increasing. The victim of an industrial accident is now provided for by legislation: as Collie says, the accident is often regarded as a valid excuse for living at the expense of the former employer.

I might here cite case after case in which I have been personally concerned and in which simulation and exaggeration of symptoms have been grotesquely obvious. In each of these, medical certificates have been furnished by fellow members of the medical profession, substantiating the impossible claims of the individual concerned. This is the aspect of a serious situation that one must regard with concern. Through ignorance, or from press of work and shortness of time for examination, or because of personal friendliness with the claimant, the doctor gives a certificate to which exception may justifiably be taken, or continues to furnish them at intervals, even years after the genuine effects of the trauma have vanished. And let it not be imagined for one moment I am criticizing the general practitioner: on the contrary, I apply to myself the same comment on the urgent need for scrupulous care and faithful scrutiny of all the facts of every case. A certain individual, in connection with one of the railway accidents above referred to, went to a well-known consultant in London and stated he had been in the train and received a severe nervous shock. A certificate was given to the effect that he was suffering from 'traumatic neurasthenia,' and on the strength of this certificate he was awarded £200 compensation by the railway company. It subsequently transpired he had never been in the accident at all! The moral is plain enough.

* Since this paper was written, we learn from the Second Report of the Miners' Nystagmus Committee of the Medical Research Council that "not only the number of fresh claims but the average duration of incapacity has risen enormously, facts which . . . have no relation whatever to the actual prevalence of the disease, but solely to the facilities for obtaining compensation" (*Lancet*, 1923, ii, 293).

A CASE OF UNILATERAL BULBAR LESION, PROBABLY SYRINGOBULBIA, WITH SPECIAL REFERENCE TO THE SENSORY PATHWAYS WITHIN THE MEDULLA.

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INTRODUCTION.

Of the descriptions available of dissociated sensory disturbances resulting from lesions of the medulla that which is associated with the occlusion of a posterior inferior cerebellar artery is by far the most frequently met with. The medullary syndrome effected by such a lesion is well known. On the other hand, the descriptions of similar disturbances in sensation consequent upon medullary lesions due to other causes are less numerous.

Clinical examination in the case to be described gave evidence of changes in sensation in many ways similar to those which occur in cases of occlusion of a posterior inferior cerebellar artery. Taking into account, however, the age of the patient, the sequence of the symptoms and their relatively slow accumulation, I am of the opinion that the lesion was not one of vascular origin. It is suggested, for reasons to be given later, that the case was one of syringobulbia.

Although handicapped by the want of a precise pathological definition of the nature and limits of the lesion in question, yet the character of the disturbances effected in the various sensory modalities was thought to be of sufficient interest for their publication. To Dr. Kinnier Wilson, under whose care the patient was admitted to the National Hospital, Queen Square, I wish here to express my indebtedness for permission to make the following report.

DESCRIPTION OF CASE.

Miss L. H., sixteen years old, draper's assistant, was admitted to hospital in December, 1922. At the age of ten she had had an operation for adenoids, and had suffered from 'rheumatism,' first at four years of age, and frequently since in the arms, shoulders and legs. Her father died of cancer at the age of forty-four; her mother was living. Of nine children only one brother and one sister survived besides herself; the remainder died in infancy. She stated that for a twelvemonth before admission her voice had become of a lower pitch. In the same period several deep cracks had developed in the skin of the fingers of the right

hand. These were painless and very slow in healing, and she did not remember any injuries likely to have caused their appearance.

In November, 1922, she became unsteady on her legs. Shortly afterwards, in the same month, she began to experience a sensation of coldness in the right extremities and half of the body. She further observed that on placing the right arm in hot or cold water she was unable to appreciate the temperature of the water. Following upon the abnormality in sensation on the right side, a feeling of coldness developed in the left half of the face. Also the left pupil became smaller, and the left eyelid drooped slightly. She stated that she mistrusted her left hand, as she occasionally dropped things which she attempted to hold in it (this symptom subsequently disappeared). She had a tendency to be unsteady in walking, but was doubtful which leg was at fault. Swallowing was apt to make her cough. It seemed at times 'as if something pushed the food back into the mouth again.' Shortly before admission to hospital she received a small burn on the right hand, which produced a blister. This injury was not attended by any pain.

State on Admission.—The patient was of medium height, small-boned and poorly nourished. No abnormality was observed in the shape of the head. The teeth were well formed but asymmetrical, the left lower central incisor being almost in the mid-line. No deformity of the spine was noticed, except that the spinous processes of the ninth to the twelfth dorsal vertebræ were bifid at their extremities. The cardiovascular, renal, alimentary and respiratory systems were unaffected.

The Nervous System.—The fundi and visual fields were normal. A reduction in the size of the left pupil and palpebral fissure was apparent. The pupil reactions and ocular movements were undisturbed, and no nystagmus or diplopia was present. The left corneal reflex was absent. In the distribution of the left trigeminal nerve minimal tactile stimuli were appreciated, but felt lighter than did similar stimuli upon the right half of the face. Pin-prick over the left fifth was felt as a blunt point upon the forehead, and as 'very dull' below this down to a line running roughly from the corner of the mouth to the tragus of the ear. Below this again, over the remainder of the fifth distribution, pin-prick was less dull (*Fig. 1*). Appreciation of heat was absent upon the forehead and

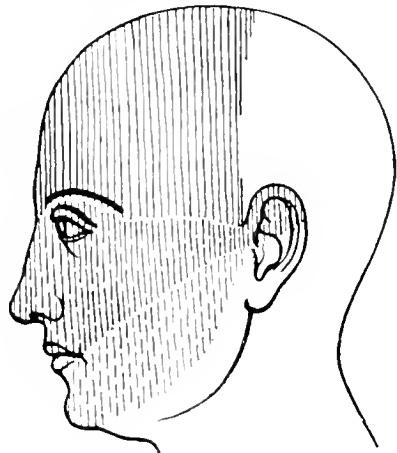


FIG. 1.—Showing variations in loss to painful cutaneous stimuli over left face.

showed similar variations below that level to those of painful sensibility. Cold was said to be sometimes warm, sometimes neutral, the perverse sensation being most frequent below the level of the forehead.

As regards sensation inside the mouth, pin-prick was reduced in appreciation on the left half of the tongue and on the left side of the soft palate, fauces and pharynx. The touch of a camel-hair brush could be felt on the left side of the tongue, palate, fauces and nasopharynx, but was said to be less than on the right side. There was a difference in

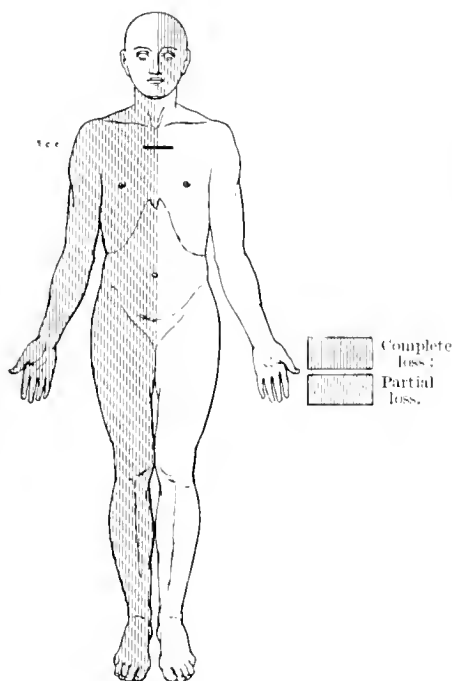


FIG. 2.—Analgesia.

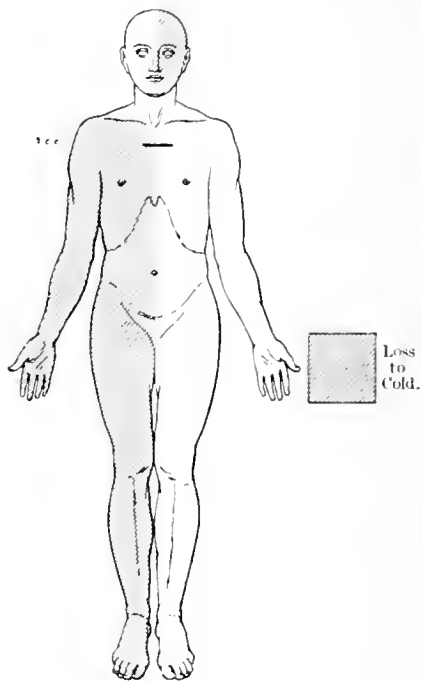


FIG. 3.

pressure pain upon the two sides of the tongue, sensibility being less upon the left than upon the right side.

The palatal and pharyngeal reflexes were absent, except for a very weak pharyngeal reflex upon the right side. On phonation the palate moved equally well upon both sides, but the left vocal cord was seen to be fixed in the abducted position. There was occasional difficulty in swallowing. The tongue on protrusion deviated slightly towards the left. Taste was unaffected on both halves of the tongue.

The integrity of the seventh, eighth and eleventh nerves was preserved upon the left side, and no defects were observed in the cranial nerves upon the right side beyond the absence of the palatal reflex already mentioned.

Sensation on the right extremities and half of the body was severely disturbed, and less deeply upon the right side of the neck. Sensibility to heat, cold and pain was markedly reduced (*Figs. 2, 3, 4*). Very hot stimuli were observed as being 'just warm' or 'warm.' More mistakes were made with cold, which was sometimes mistaken for warmth, and frequently said to be neutral. Tactile sensibility, however, was very lightly impaired upon the right side, in that cotton wool felt lighter than upon contralateral parts, but all stimuli were appreciated (*Fig. 5*).

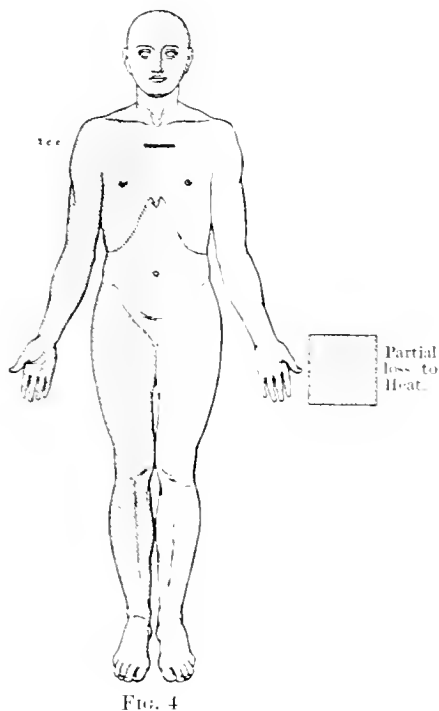


FIG. 4

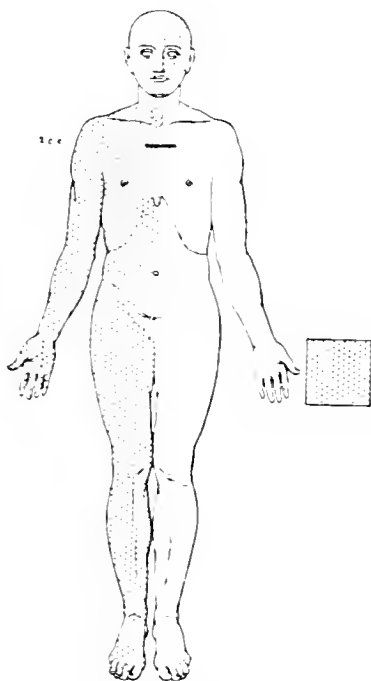


FIG. 5.—Very faint impairment of tactile sensibility.

Posteriorly there was a doubtful disturbance of sensation over the right half of the scalp.

Other Forms of Sensibility.—*Power of Localization and Compass Points Test:* The power of localization of a point touched could not be said to differ on the extremities of the two sides or on the two halves of the face, and was everywhere within normal limits. Compass points at 1 cm. or even 5 mm. distance apart were equally well recognized upon the two hands. On the face tests gave similar results upon the two sides.

Percception of Vibrations: The vibrations of a tuning fork were more distinctly felt, and lasted longer, upon the left extremities and side

of the body, than upon the right. The difference between the two sides was not great.

Appreciation of Difference in Weight : Several small loaded boxes of similar size, varying by 10 gm. from 10 to 100 gm. in weight, were employed in this test. Care was taken to place each box used very gently upon the patient's upturned palm. In some tests the patient was allowed to move the hand up and down two or three times; in others the hand lay upon a support. Over a series of examinations occasional mistakes were made with the patient's right hand between weights differing by 10 gm. These mistakes were chiefly made between the weights at the foot of the scale, 10 and 20 gm. The results of tests with the left hand were less faulty: scarcely any mistakes were made.

Stereognostic Sense : The stereognostic function, as tested by the placing of various common articles in the patient's hands, seemed to be unaffected. Minor differences in texture, smoothness and roughness were, if anything, better recognized with the left than with the right hand, but the inequality in sensitiveness between the two hands was very slight.

Sense of Position in Space and of Passive Movements (Muscular Sense) : The perception of passive movements was equally good for the extremities of either side. The sense of position in space also seemed to be unimpaired.

Pressure Pain Sense : An algometer was employed so that the results might be recorded. In the application of pressure to the face, head and extremities, the part examined was always supported, so that gross displacement of the head or of a limb could not take place. When the instrument was pressed against the cheek, its point of pressure was supported by a finger placed within the mouth.

Reference to *Figs. 6 and 7* will show that an appreciably greater pressure was required to produce pain upon the left side of the face and right extremities and half of the body than upon contralateral parts. This difference was most noticeable between the two hands. The numbers on the charts represent pressure in kilos and are the main results of numerous observations (*Figs. 6, 7*).

In the motor system the grasps and power of the two arms were equally good. The left leg was a little stronger than the right. No muscular wasting or fibrillation was anywhere observed. Muscle tone, as tested upon the two sides by clinical methods, showed no disparity from the normal. A trace of left-sided *asynergia* was detected in both arm and leg, which, however, subsequently disappeared. *Reflexes :* The tendon jerks of the right limbs were slightly more active than those of the left. The right plantar gave a doubtful response, while the left was definitely flexor in type: the superficial abdominal reflexes were present upon both sides. No involvement of the sphincters was present.

Trophic Functions: Three deep cracks in the skin of the fingers and a blister on the palm of the right hand were present. None of these lesions had at any time given rise to pain.

Subsequent examination over a period of two months showed no change in the appreciation of the various forms of sensibility mentioned. The subjective sensation of coldness of the left face and right extremities was still complained of, but to a less degree. A slight difference in tactile sensibility between contralateral parts was present, as on the first examination. The trace of asynergia observed on admission in the left extremities could not be detected subsequently. Also the muscular power of the two sides appeared to have become equalized. The right knee-jerk was still found more brisk than the left, and the right plantar continued to give an indefinite response, the left that of a purely flexor type.

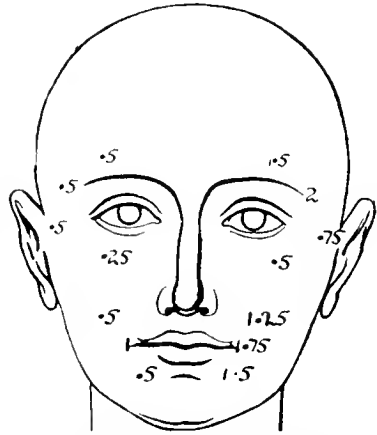


FIG. 6.—Deep pressure pain on face.

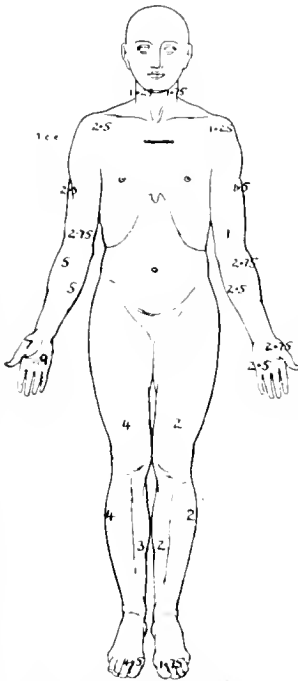


FIG. 7.—Deep pressure pain on body.

SITE OF THE LESION.

From the description of the symptoms in the above case, it is apparent that a lesion existed in the left half of the medulla. The disturbance in function of the ninth, tenth and twelfth cranial nerves and the integrity of function of the sixth, seventh and eighth nerves at a higher level, and of the eleventh below, were strongly in favour of a lesion having its greatest dimensions in the medulla at the level of the olive.

The area of damage, presumably, did not extend across the median raphé, as there was an absence of any signs of sensory impairment of the posterior column type in the left half of the body.

NATURE OF THE LESION

The age of the patient and the absence of cardio-vascular degeneration rendered improbable the existence of a vascular lesion.

Both in the blood and C.S.F. a negative Wassermann reaction was obtained. No evidence of a tuberculous focus was discovered anywhere, and the possibility of such a lesion being present was not strengthened by the absence of a relative lymphocytosis in the blood. Further, a negative blood complement-fixation test with T.B. antigen was obtained. That the case might possibly be one of tumour was more difficult to disprove. In favour of the diagnosis of syringobulbia there was the presence of trophic changes, which were among the earliest symptoms to appear. Also the progression of symptoms was relatively slow, and no further advance in the malady occurred during the two months the patient was under observation.

DISCUSSION.

In an analysis of the symptoms produced by a unilateral lesion of the medulla, the main interest lies in the presence of disturbance in some forms of sensation and in the integrity of others. Justly it can be said that from clinical evidence alone one is restricted to indicating the dissociation of the forms of sensation, without dogmatizing upon the localization of their paths of transmission. Assumptions, however, as to the localization of the sensory tracts in the medulla are not unjustifiable when they are based upon the evidence obtained from the pathological investigations of other cases of a similar type.

In the case reported, interference with the function of the left glossopharyngeal nerve was indicated by the marked hypalgesia of the fauces, pharynx, and of the posterior third of the tongue upon the left side: light touch, on the other hand, was appreciated over the same area, but less well than upon the opposite side. There were, then, indications of a dissociated anæsthesia in the territory of the ninth cranial nerve. The left vocal cord was paralysed, and the pharyngeal and palatal reflexes were abolished, except for a very sluggish pharyngeal reflex upon the right side. Therefore the tenth cranial nerve was also affected. Cases of unilateral lesions of the medulla, verified pathologically, have been reported in which the pharyngeal and palatal reflexes were abolished upon both sides. The explanation given was the bilateral innervation of these structures.

In the territory of the fifth there was evidence that the descending root of this nerve had been damaged. The functions of the motor fifth, sixth and seventh cranial nerves were undisturbed. It is, therefore, probable that the uppermost part of the descending root of the fifth had escaped injury at the level of these structures in the lower part of the pons. In the trigeminal area upon the side of the lesion a dissociation was present of the sensations of temperature, pain and pressure from that of touch, which was disturbed to a much less degree. Further dissociation of sensation in the same area was evidenced by the fact that localiza-

tion of a point touched and the recognition of two points simultaneously applied were correctly appreciated.

As regards tactile sensation in the trigeminal area, Bergmark¹ gives it as his opinion that the sense of touch cannot be localized to the descending root alone, but chiefly to the main sensory nucleus of this nerve in the pons. In support of this view, he quotes the opinion of Brouwer, who had come to the same conclusion.

Bergmark cites two cases of medullary lesions, both anatomically investigated, one being a case of his own, and the other that of Monakow and Brun, in which the descending root of the fifth was included in the area of damage. In each case the lesion was due to occlusion of a posterior inferior cerebellar artery. Pain and temperature senses in both these cases were affected on the face upon the side of the lesion, while the sense of touch was undisturbed. In a case of Wilson's,² also of thrombosis of a posterior inferior cerebellar artery, the lightest touch was stated by the patient to be less 'tickly' on the face on the side of the lesion, while sensibility to pain and temperature was markedly affected. Bergmark also calls attention to an unusual case of a similar nature clinically examined only, that of E. Müller, in which the senses of touch and pressure were impaired over the first division of the trigeminus, while pain and temperature were not disturbed on the face upon the side of the lesion. Upon the opposite half of the face hypalgesia and thermal hypæsthesia were present with normal tactile appreciation.

There is considerable justification, therefore, for considering that the sense of touch in the territory of the fifth nerve is but partially represented in its descending root.

It is recognized, however, that in unilateral lesions of the medulla the sensory disturbances on the face need not be limited to the side of the lesion. Many cases have been reported in which there was disturbance of sensation upon both sides. In Wilson's case of thrombosis of the left posterior inferior cerebellar artery, the appreciation of all degrees of heat was lost upon the left face, while similar stimuli were felt as tepid upon the right half of the face. Sensibility to cold was lost upon both sides. The loss to pin-prick was upon the left side only.

In Wallenberg's³ case, of occlusion of the left posterior inferior cerebellar artery and adjacent portion of the vertebral above, pain and temperature were diminished on the right side of the face and over the first and second branches of the fifth on the side of the lesion. Tactile sensation was unimpaired.

In E. Müller's⁴ case 1, already mentioned, the sensory disturbance upon the face was bilateral. Tactile sensation and pressure sense were impaired over the first division of the fifth on one side, while pain and temperature were disturbed upon the opposite half of the face.

In case 3 of Gordinier,⁵ of thrombosis of the right posterior inferior

cerebellar artery, he found a reduction to pain and temperature on the right side of the face and loss of the same on the left side.

Still further variations in sensation in the trigeminal areas have been discovered in cases of unilateral lesions of the medulla. The face upon the side of the lesion may have all forms of sensation intact. In Müller's ⁴ case 2, pain and temperature were diminished on the side of the face opposite the lesion, tactile and pressure sensation being normal. Sensation over the face on the side of the lesion was unimpaired. A similar type of sensory disturbance was found by Gordinier in his case 2.

The difficulty in understanding such variations in the sensory disturbances effected by unilateral lesions of the medulla is considerable. It must be remembered, however, that we are often not dealing with the descending root of the fifth by itself. There are also the associated cells in the substantia gelatinosa, with their more central quinto-thalamic fibres, which are liable to be damaged by lesions in this region. It is thought that these fibres arising from the cells in the substantia gelatinosa cross over to the opposite side at an early stage in their course. The direction followed by these fibres in traversing the median raphé is uncertain. Wallenberg suggests that they take a dorso-medial direction passing ventral to the position of the twelfth nucleus, decussate and turn upwards in the lateral region of the formatio reticularis. Bury and Stopford ⁶ diagrammatically represent the crossed position of these fibres in the medulla as lying dorso-medially and in close apposition to the spino-thalamic tract.

Such an arrangement, though not conclusively proved, at any rate makes it more easy to understand how sensory disturbances may be present on one or both sides of the face in cases of unilateral lesions of the medulla. For it is obvious that the sensory disturbances produced by such a lesion must vary in accordance with the number of these structures mentioned above which have been damaged.

Thus, Bury and Stopford describe a case of occlusion of a posterior inferior cerebellar artery in which the sensibility to pain and temperature was disturbed upon the face, extremities and trunk on the side opposite to the lesion in the medulla. In this case they postulate that the crossed fibres subserving pain and temperature for the whole of one half of the body in the spinothalamic and quinto-thalamic tracts had been damaged in their course through the medulla, and that the descending root of the fifth had not been disturbed by the lesion. The absence of damage to the descending root of the fifth on the side of the lesion would account for the integrity of sensation upon the face on the same side.

An additional point of interest in connection with the sensory disturbances in the territory of the fifth nerve is met with sufficiently often to be worthy of attention. Frequently the impairment, in the sensations of pain and temperature especially, is found to vary in depth

over different areas of the trigeminal distribution. The disturbance is usually greatest over the forehead, and less within the territory of the second and third divisions. In the case described in this paper the reduction in the thermal and painful sensibility was greatest in the area of the first division. The area of distribution of the second was less, and of the third least, affected. In both of E. Müller's cases, in which there was hypalgesia and thermal hypæsthesia over the whole of the opposite half of the body, including the face, from the side of the lesion, the impairment in the trigeminal area was greatest in the region of the first branch.

By way of contrast to the above, case 1 of Breuer and Marburg⁷ may be mentioned, in which the disturbance of pain sensibility on the face on the same side as the lesion was more profound in the third division of the fifth, although all three divisions were affected. A pathological examination in this case revealed the presence of thrombosis of the left vertebral artery. The area of damage in the medulla was the same as that commonly found to result from occlusion of a posterior inferior cerebellar artery.

An inequality in the depth of sensory disturbance in the divisional areas of the trigeminal nerve, at any rate when present upon the same side as the lesion, may be accounted for in the following manner. It is probable that a nuclear systematization exists of the sensory fibres of the trigeminus, which pass into its descending or spinal root. Thus, from below upwards the terminations of the ophthalmic, superior maxillary and inferior maxillary fibres which enter the descending root are considered to be in that order. Among those authors who give it as their opinion that such an arrangement exists are Wallenberg, Bergmann and Schlesinger. It is obvious that a lesion in the medulla falling short of the main sensory nucleus of the fifth nerve in the pons will leave undisturbed a varying proportion of the descending root in its uppermost part. One would expect, therefore, the sensory disturbance in the third division to be more often of less intensity than in the second or first divisions.

In opposition to the above localization there is the theory of Woods,⁸ who describes two cases in which the disturbance of pain and temperature was suggestive of a segmental distribution. He considers that there is a representation in the descending root of successive cutaneous zones, the outermost of which is limited by a line from the vertex of the skull by way of the ear to the chin, each succeeding zone being of smaller radius until the nose is reached. Representation for the outermost zone he assigns to the caudal end of the descending root of the fifth, and so on. His first case was one of syringomyelia and syringobulbia. In many cases of such a nature the outline of the area of impaired sensibility upon the face not infrequently corresponds to one or other of the zones

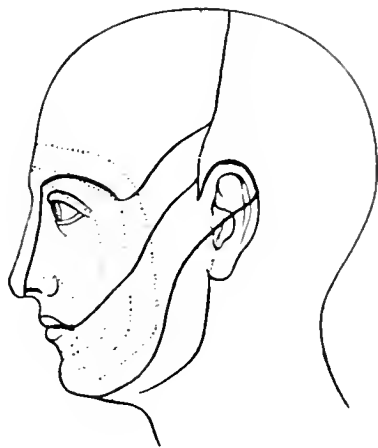


FIG. 8.—Composite diagram. The continuous lines indicate the areas supplied by the trigeminal branches. The dotted lines indicate possible segmental areas of the quinto-thalamic fibres.

described above. It is suggested that such sensory changes are due not to disturbance of the descending roots so much as to interference with the crossed or uncrossed portions of the quinto-thalamic fibres as they traverse the medulla, while at the same time undergoing a regrouping of a segmental character (*Fig. 8*).

A considerable disturbance in the sense of pressure pain was present on the face in the case described in this paper upon the same side as the impairment in the sensations of pain and temperature. This coincides with the deduction of Head and Thomson,⁹ that there is loss to both deep and superficial painful stimuli when the lesion is above the peripheral level.

G. W. Robinson¹⁰ agrees that a lesion of the spinothalamic tract in the cord makes no distinction between pain of a deep or superficial quality, and that they are also closely associated in the brain stem. He states, however, that on the face, while superficial pain may be grossly affected, the algometer may indicate only a partial loss of deep pain sense. From their researches upon the sense of pressure pain on the face, eye and tongue, Maloney and Foster Kennedy¹¹ conclude that in intracranial interference with the fifth nerve the sense of pressure pain is disturbed.

On the other hand, in Wilson's case the sense of pressure pain was unaffected upon the side of the face presenting reduction in both painful and thermal sensibility. In a case reported by Robinson,¹⁰ pressure pain was not disturbed on either side of the face, but was reduced on the extremities and trunk contralaterally to the lesion in the medulla. Superficial pain was impaired over the opposite side of the face to the lesion.

It is, therefore, apparent that the association of the superficial and deep forms of pain from the trigeminal area is capable of disruption within the medulla.

In regard to the sense of taste, this form of sensation was found to be intact upon both sides of the tongue in the case described. Gustatory sensations, therefore, were dissociated on the left half of the tongue from those of pain, painful pressure, and, to a less degree, from touch.

Considerable dubiety still exists in connection with the question whether any of the fibres subserving the function of taste enter the

brain stem in the fifth nerve or not. It is generally held that the bulk of the gustatory fibres from the anterior two-thirds of the tongue ascend by the lingual, chorda tympani and seventh nerves to the geniculate ganglion, and enter the brain stem by the nervus intermedius of Wrisberg.

After entering the brain stem, in close relationship with the seventh and eighth nerves, the nerve of Wrisberg traverses the dorsal part of the descending root of the fifth at a high level. The fibres then bend downwards to enter the tractus solitarius, which in a cross section of the medulla lies just ventrolaterally to the ala cinerea of the floor of the fourth ventricle. In the nucleus of this tract the fibres terminate.

The nucleus associated with the tractus solitarius extends throughout the entire length of the medulla and receives the fibres of the nervus intermedius and the gustatory fibres of the glossopharyngeal nerve (Ranson). It is probable in cases of unilateral lesions of the medulla that the state of integrity of the sense of taste on the side of the lesion depends entirely upon the presence or absence of damage to the above tract and its nucleus.

According to Nageotte,¹² on the other hand, the gustatory nucleus extends upwards into the pons, and is at its superior extremity in intimate relationship with the sensory nucleus of the fifth. At its lower end in the medulla it is in contact with the uppermost part of the tractus solitarius, constituting what is known as the nucleus or gelatinous substance of this tract. Nageotte is of the opinion that trigeminal fibres subserving taste enter the gustatory nucleus at its upper end. The entry zone for the fibres of the nervus intermedius he considers to be in the middle portion of the nucleus, the taste fibres from the glossopharyngeal nerve entering at a lower level. In support of his argument he quotes an observation of Wallenberg's on a case which showed anaesthesia in the left trigeminal region, loss of taste at the back of the tongue on the left side, and left-sided hemiatrophy of the tongue. The hypoglossal and part of the trigeminus were damaged by the presence of a tumour, while the nerve of Wrisberg and glossopharyngeal nerve were intact. Degeneration of the fibres attached to the gustatory nucleus was greatest at its upper end. For this reason, Wallenberg came to the conclusion that taste fibres were present in the fifth nerve.

Cushing,¹³ however, in a series of cases found that the sense of taste remained unaffected after the removal of the Gasserian ganglion. It may, therefore, be inferred that, if any taste fibres exist in the trigeminal nerve, the severance of these fibres does not normally produce any demonstrable impairment in the sense of taste.

Raymond and François¹⁵ describe a case of a unilateral pontine lesion in which there was absence of taste on the anterior two-thirds of the tongue, while sensation in the territory of the fifth upon the same side was unaffected. They remark that in this case it is difficult to

suppose that the fifth nerve played any part at all in the perception of gustatory impressions.

Concerning taste upon the posterior third of the tongue, Henschen¹⁴ reports a case of a unilateral lesion of the medulla in which there was, at the first examination, normal taste sense over the posterior third of the tongue on the side of the lesion. On the anterior two-thirds of the same side taste was impaired. At a later date the sense of taste over the posterior third became 'lighter' and delayed. In the majority of cases, however, of unilateral lesions of the medulla, it is usual to find the sense of taste either preserved or disturbed upon the whole half of the tongue.

The remote effects of the lesion in the case described in this paper consisted of a crossed disturbance of painful, thermal and pressure pain sensations upon the extremities and half of the trunk; tactile sensation was dissociated, being only lightly disturbed in comparison to these other forms of sensation. From the raising of the thresholds of pain and painful pressure in the parts mentioned, additional evidence is gained in support of the view that their paths of transmission are closely associated as they pass through the medulla in the spinothalamic tract.

Disturbance in the power of localization, appreciation of two compass points and of weights, stereognosis, vibration and muscular sense was restricted to a very slight impairment in a limited number of these forms of sensibility. These forms of sensation are commonly supposed for the most part to have their pathway in the lemniscus at the level under discussion. That the sense of vibration, appreciation of weights, and stereognosis, showed slight impairment in the right extremities suggested some interference with the lemniscus on the side of the lesion.

The integrity of the muscular sense is of interest. Bergmark considers that this form of sensibility must have a double pathway, one being in the posterior columns and the lemniscus, and the other in the direct cerebellar tract of Flechsig. Cases are on record of unilateral pontine lesions at the level of the decussation of the superior cerebellar peduncles, in which the muscular sense was severely affected upon the contralateral side of the body. Presumably in such cases decussation had occurred of both possible pathways of muscular sense. In the bulb, a lesion affecting either Flechsig's tract or the lemniscus in the opposite half of the cord has been found in several cases to have produced in the acute stages some disturbance of the muscular sense, which has later disappeared. The recovery of the muscular sense was due apparently to the fact that one of its possible paths of transmission remained undisturbed.

Bergmark describes a case of tumour at the level of the foramen magnum which produced severe compression and demyelination of the

posterior columns and of Flechsig's tract upon one side. In this case the muscular sense on the same side was greatly disturbed.

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Short Notes and Clinical Cases.

A CASE ILLUSTRATING THE ETIOLOGY OF THE ARGYLL ROBERTSON PUPIL.

By F. J. NATTRASS, NEWCASTLE-ON-TYNE.

IN the issue of this Journal for May, 1921, Kinnier Wilson discusses fully the various views which have been held as to the etiology of the Argyll Robertson pupil. From the clinical and pathological evidence available he concludes that the phenomenon occurs in many conditions apart from syphilis, and may result from any lesion which interrupts the colliculo-nuclear fibres passing from the superior colliculi to the oculomotor nuclei and skirting the central grey matter of the aqueduct. He also points out the recognized association of lesions of the superior colliculi with defective conjugate movements of the eyeballs in the vertical plane.

The case here described appears to afford valuable evidence of the correctness of this view. It is that of a soldier in whom a fragment of shrapnel, entering the skull through the posterior part of the right parietal bone, can be shown by x-ray photographs to have traversed the upper part of the mid-brain. Among other effects this injury has produced classical reflex iridoplegia in both eyes.

History.—The patient is twenty-nine years of age, and his pre-war occupation was a coal-hewer. He was wounded by a shell on January 27, 1916, in the head and the left buttock. The left sciatic nerve was severed, and was sutured in 1919 with a good result, considerable voluntary power having returned.

He states that after the wound he was unconscious for eleven weeks. On regaining consciousness he was paralysed in the right side of the face (lower half only), right arm and right leg, both limbs lying useless. He also saw everything double for the first three or four weeks, and he still sees double when reading, unless he closes one eye. One month after regaining consciousness shaking commenced in the right arm; the movements affected the whole limb from the beginning, and rapidly became very severe. Six weeks later similar movements began in the right leg, and about the same time in the lower half of the right side of the face. Since this time the movements have continued without

cessation, except during sleep, when they cease entirely. There has been no appreciable improvement up to the present date. The movements are aggravated by any excitement.

He had some loss of bladder control for the first month after regaining consciousness, but now control is perfect. The bowels have always been quite normal.

Present Condition.—The general condition is good, and intelligence above the average: he eats and sleeps well, and the involuntary movements appear to cause remarkably little mental distress.

The entrance wound in the skull is situated 1 in. to the right of



FIG. 1.—Antero-posterior view.

the mid-line and $\frac{1}{2}$ to 1 in. above the level of the superior angle of the occipital bone (cf. *Fig. 3*). There is a defect in the bone at this point, which is now covered with sound skin; no pulsation can be felt. There is no exit wound.

The right upper and lower limbs are the seat of constant coarse, almost violent, tremor, and the right side of the mouth is continually twitching; there is no trace of involuntary movement in the upper part of the face or in the left limbs. The right upper limb is carried in the position of adduction at the shoulder and flexion at the elbow, wrist and finger joints; the right lower limb is kept extended at the knee, with the ankle plantar-flexed and the toes flexed. With the

exception, however, of the toes, which cannot be moved owing to muscular rigidity, all parts of both limbs can be moved both voluntarily and passively without difficulty, and the power of grip in the right hand, though diminished, is quite good. The tremor affects in the upper limb chiefly the biceps, brachialis, flexors of wrists, and to a less extent flexors of fingers; in the lower limb both flexors and extensors of the knee, calf muscles and flexors of toes. The excursions of the tremor are wide and powerful, and their rate about four per second.

Cranial Nerves.—There is a slight stammer, which the patient has always had. Vision about 6/60 in right eye, 6/36 in left eye. No



FIG. 2.—Lateral view.

squint at rest. The lateral and downward movements and convergence of the eyes are normal, but there is distinct defect of upward movement of both eyes, more marked in the right eye, so that on deviation in this direction a slight strabismus is produced. There is a slight rotatory nystagmus on deviation to the left, and a slow horizontal nystagmus on deviation to the right. The pupils are of medium size, the left very slightly larger than the right, and the outline of both is quite regular. The direct reflex contraction to light is completely absent in both eyes, while both pupils contract briskly and fully on convergence-accommodation. The consensual light reflex is also absent in both eyes. These observations have been repeatedly verified.

There is no hemianopia, and the optic discs are of good colour and show no swelling. There is distinct weakness of the right lower face. No abnormality can be found in the remaining cranial nerves.

Reflexes.—The tendon reflexes in the left upper limb are normal. Owing to the tremor it is impossible to test them in the right upper or lower limb, while in the left lower limb both knee and ankle jerks are abolished as the direct result of the wound in the buttock, the quadriceps being much wasted as well as the muscles of sciatic nerve supply.

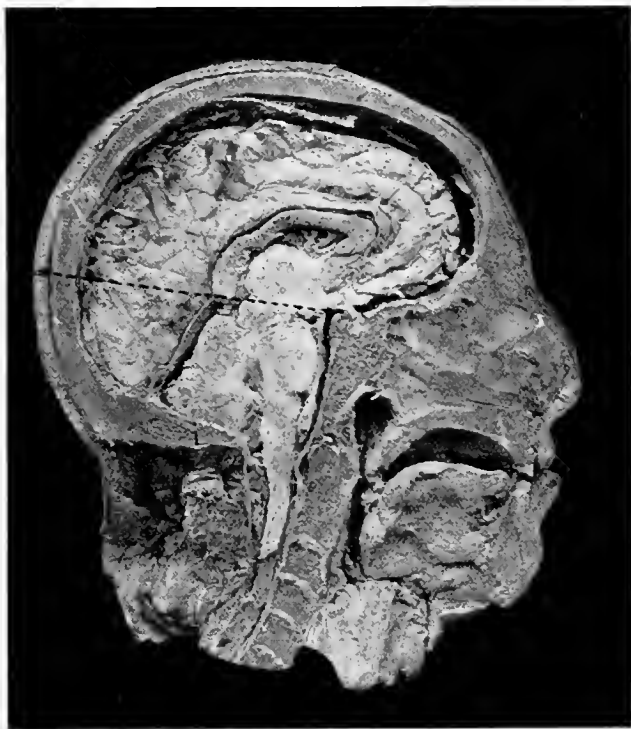


FIG. 3.—The dotted line indicates the course of the fragment of shrapnel.

The abdominal reflexes are normal. The left plantar reflex is flexor, while it is impossible to obtain the right owing to the rigid flexion of the toes.

Sensation.—Sensibility to pain, touch, heat and cold is everywhere normal except in the left lower limb as the result of the sciatic nerve lesion. There is no astereognosis on either side.

The Wassermann Reaction of the blood is completely negative.

X-ray photographs of the skull were obtained with considerable difficulty, owing to the tremor which shook the whole body, and I am much indebted to Dr. H. E. Gamlen for his skill and patience in this

respect. Reference to *Figs. 1 and 2* will show that the shrapnel fragment is situated near the upper surface of the base of the skull. Viewed antero-posteriorly the fragment is seen to be just to the left of the middle line: while the lateral view shows that it has probably been arrested by the tip of the left posterior clinoid process.

To demonstrate the relation of the nervous structures to this part of the skull a photograph (*Fig. 3*) was taken for me by Dr. H. B. Leaster Dixon of a specimen in the Anatomical Department of the University of Durham College of Medicine (by kind permission of Professor Howden). It appears to be certain from this photograph that the shrapnel must have traversed the mid-brain, and if its course was direct from the point of entry to its present situation it must have pierced the upper pair of quadrigeminal bodies, as suggested by the line drawn in the figure. Its slightly lateral direction from right to left makes it probable that both of these bodies would be injured.

The area damaged, therefore, corresponds exactly with the site considered by Wilson to be concerned in the production of the Argyll Robertson phenomenon.

The tremor is clearly associated with injury to extra-pyramidal motor paths in the left side of the mid-brain or possibly to the left red nucleus itself. Damage to the pyramidal fibres must necessarily have been incomplete to permit of the occurrence of the tremor.

SUMMARY.

1. A case is described of gunshot wound of the head in which a fragment of shrapnel is shown to have traversed the upper part of the mesencephalon.
2. The injury has resulted in bilateral Argyll Robertson pupil and defect in conjugate upward movement of the eyes. In addition it has produced right hemitremor, involving face, arm and leg.
3. The Wassermann reaction of the blood is negative, and there is no further evidence of nervous syphilis.

REFERENCE.

- S. A. KINNIER WILSON, "Some Problems in Neurology: 1. The Argyll Robertson Pupil," *Jour. of Neur. and Psychopath.*, 1921, ii.

Editorial.

NEUROLOGICAL THERAPEUTICS.

A REASON not infrequently adduced by practitioner and student for comparative neglect of, or lack of interest in, the study of nervous disease is the alleged inability of the neurologist to accomplish much for his patients from the standpoint of therapeutics. However fascinating the problem provided by the exact localization of an organic lesion within the central nervous system, it remains more academic than practical: the interest of the search does not remove the reproach that once the lesion is diagnosed there is little or nothing to be done for it. The neurologist has had this objection hurled at his head with such persistence that he is apt to ignore the real lesson it conveys. Many, indeed, are the nervous conditions of which it can fairly be said that their therapeutic handling has not advanced one step beyond that practised by an older generation. Encyclopædias of neurological treatment notwithstanding, candour prevents us from maintaining that progress on the therapeutic side of our subject has been in any degree commensurate with the advances made on the clinical, pathogenic, and pathological side. The treatment of neurosyphilis furnishes an appropriate instance. Our chase after the elusive spirochæte, smugly ensconced in the sheltered corners of the neuraxis, has not yet been crowned with success: near though we may be to the *coup de grâce*, we must remember in a chastened spirit that eighteen years have already elapsed since Schaudinn's discovery, and more than a decade since that of Ehrlich. In the meantime the hunt has deviated down side trails, which cannot lead anywhere. The treatment of general paralysis by inoculation with malarial blood seems contrary to therapeutic principle, and, if some rumours are to be believed, the patient recovers from one infection only to succumb to another. *Il est mort guéri*, said the enthusiastic Frenchman of the story, but the matter is too serious for a jest. Wanting still an infallible spirochæticide, or at least the means for its application, we have not done much better with any of the newer remedies than our fathers did with a few pence' worth of mercury.

For the numerous varieties of cerebrospinal vascular disease no improvement on the time-honoured potassium iodide has been registered, even though nearly forty years have passed since Sir William Gowers

pointed out the disadvantage entailed in its use, viz., its tendency to produce coagulation, especially if exhibited in large doses. Of the different preparations of iodine vaunted in the medical market-place by not disinterested parties, one may fairly say that the more they change the more they remain the same. Another *bête noir* of the conscientious neurological therapist is the sclerosis of secondary glial proliferation. Shall we ever be able to discover a solvent? Fibrolysin and other remedies of the same type have flattered only to deceive. We do not hear much now of the treatment of syringomyelia and central gliosis by radium or x-rays—praiseworthy though seemingly futile attempts to ‘do something’ for a not uncommon disease, the unfortunate sufferers from which supply ante-mortem clinical problems for budding neurologists and post-mortem material for morbid anatomists, but have nothing to offer the therapist. Subacute combined degeneration of the spinal cord still awaits a specific remedy. Its remarkable pathology, with its curious resemblance to that of pellagra, suggests a line of approach from the standpoint of deficiency disease, though some recent efforts at treatment by the administration of vitamins have not proved particularly encouraging. Myasthenia gravis is another affection calculated to damp the ardour of the therapist, while over the myopathies and muscular dystrophies therapeutic helplessness lies like a pall.

In none of these and other nervous maladies that might be referred to, has any therapeutic benefit accrued from the most painstaking pathological investigation, and we may well begin to question the value of the hackneyed contention that morbid anatomy furnishes the key to diagnosis, and so to treatment. It does nothing of the kind. Disease is a process, yet we allow ourselves to be beguiled by end-results. The information garnered by scrutiny of the dead brain and spinal cord is of great value—for the anatomist and morphologist; it is the reproduction of disease-processes in the experimental animal and their intensive study in life that is calculated to aid treatment. Disseminated sclerosis offers an instance in point. Its cause is no more known to us than it was to Cruveilhier, though its morbid anatomy lies revealed to the last fibre. Neurological dovescotes were fluttered some short time ago by the announcement that a spirochæte had been discovered in that affection, and what if the finding is not, as a fact, substantiated? At the least it is only through the artificial reproduction of the disease-process by the experimental pathologist that any hope can come. For some nervous diseases, fortunately, he has pointed the way to successful treatment. Epidemics of acute anterior poliomyelitis and of acute cerebrospinal meningitis have come and gone, and we are within measurable distance of specific treatment for the latter, if not, perhaps, for the former. The same cannot yet be said of the affection at present tormenting neurological circles, viz., epidemic encephalitis, although from time

to time the discovery of its virus is duly announeced, only to turn out to have been, in the classic phrase, greatly exaggerated. We may be assured, none the less, that light will eventually come in the way already mentioned, though never by fumbling in the dark among neural cicatrices.

Another large group of nervous maladies presents an even more painful therapeutic problem. What has neurological science been able to accomplish for its cases of Friedreich's disease, its cerebellar atrophies, its familial amauroties, its Huntingtonians and Parkinsonians, and the whole enormous class of neural degenerations? The problem will not be solved by juggling with nerve tonics, but by the quest of the elixir vitæ. Is this as elusive as it was to the mediæval philosopher? Perhaps the late Dr. Maudsley foresaw a possible solution in a fine passage: "It is not for the most part that brains wear out in old age; many times they would go on longer if they were properly fed with energy from below, but the organic functions decay and fail; it is their failure which causes desire to wane and the grasshopper to be a burden; they are the sources of life's energy and relish, and in their integrity and vigour lies the secret of a fresh and active old age."

Abstracts.

Neurology.

NEUROPATHOLOGY.

- [65] The pathology of amyotrophic lateral sclerosis (Zur Pathologie der amyotrophischen Lateralsklerose).—NAITO. *Jahrb. f. Psychiat. u. Neurol.*, 1922, xlii, 90.

THE author of this paper, impressed with the difficulty of deciding from the terminal pathological findings the nature of the process at work in any chronic nervous disease, and believing, on account of earlier findings, that in amyotrophic lateral sclerosis the process is an inflammatory one, sought through a number of brains of sufferers from this disease for a patch of recent inflammation and eventually found one. It lay in the motor cortex, and the remainder of the cortex was little affected: the pyramidal cells were considerably damaged and the cells of the other layers also suffered; there was a glia reaction which was of an inflammatory character. Some vessels in the brain substance showed great perivascular infiltration and the infiltrating cells were nearly all lymphocytes.

The author was unable to find any similar patches in other parts of the brain or in the spinal cord. He concludes that amyotrophic lateral sclerosis is the result of a chronic inflammatory process and is inclined to think that the inflammation is due, not to a toxin, but to an infection.

J. P. M.

- [66] The pathology of congenital hydrocephalus (Zur Pathologie des kongenitalen Hydrozephalus).—KUBO. *Arbeit. Neurol. Inst. Wiener Univ.*, 1922, xxiv, 49.

THE anatomical study of congenitally hydrocephalic brains has failed hitherto to demonstrate the changes which give rise to the retention of the cerebrospinal fluid, let alone the cause of such changes. Kiyoyi Kubo, in his examination of three such brains, has not met with greater success than earlier workers and has not succeeded in showing the cause of the hydrocephalus. Like his predecessors, he must have laboured, for part of the time at any rate, under the disadvantage of having very incomplete knowledge of the course of the circulation of the fluid, for his examination of the first brain was made in 1918, and the work of Dandy and Blackfan was not published till 1919. There is no indication that he became acquainted with their work before finishing his paper, and he does not refer to it in his bibliography.

Dandy and Blackfan showed that the fluid was absorbed from the sub-

arachnoid space, particularly over the cerebral hemispheres. Kubo does not mention the arachnoid at all in describing his findings, except in the case of the first brain. In it he says there were streaks of yellowish exudate, becoming organized, on the ependyma, and "in the leptomeninges of the cerebrum and cerebellum, especially in the neighbourhood of the cisterna cerebello-medullaris. Also the leptomeninges in the region of the foramen of Marchandi (Luschka) were firm and thickened."

In all his cases the ventricles were so distended that the brain substance was in many places less than half a centimetre in thickness; the ependyma was in all the cases complete or nearly so; beneath it there was a great excess of glia, and in one case some small areas of softening were present. The cortex in every case showed some microgyria; the layers of the cortex were quite definitely marked, but the cells of which they were composed always showed some arrest of development, neuroblastic forms being abundant. It is interesting to note that all three brains showed some deposit of calcium either in vessel walls or free in the brain tissue.

Towards the end of the paper, an interesting experimental finding is quoted from a paper by D'Abundo, viz., that an artificial subcortical lesion in new-born animals usually produces a cyst in the brain substance (presumably by inflammation), but that if the lesion reaches the ventricle, hydrocephalus arises, both of the injured side and of the opposite side of the brain.

Basing his theory on these results of D'Abundo's, Kubo ascribes the causation of hydrocephalus to trauma early in intrauterine life, believing that the trauma produces subcortical softenings which reach to the ventricle.

J. P. MARTIN.

[67] The pathology of tumours of the cerebello-pontine angle (Zur Pathologie der Kleinhirnbrückenwinkel-Tumoren). — NISHIKAWA. *Arbeit. Neurol. Inst. Wiener Univ.*, 1922, xxiv, 15.

THE key to this somewhat involved paper lies in the sentence: "But now it has become apparent that central as well as peripheral changes occur and that they must be closely connected with the acoustic nerve tumours." For the paper is concerned with changes within the brain occurring in cases of acoustic nerve tumours more than with the direct examination or discussion of the tumours themselves. The author found in Antoni's monograph references to twenty-one cases of acoustic nerve tumour in which some new growth in the brain was present, and he now describes a case of his own in which there were numerous small focal changes in the cortex. He was led to conclude that the intracerebral growths found by different investigators are of three different kinds: (1) a local increase of glia in such a way that its proliferation gives rise to circumscribed 'knots': the glia at the same time 'shows a pathological reaction'; (2) masses of fibrous tissue, with peculiar alterations in the blood vessels; and (3) tumours containing nerve fibres and of the type of neurinomata.

The first group comprises his own case and most of the others: the glial foci are usually about the size of a pinhead; they appear on the surface of

the brain and the pia is adherent to them. Nishikawa sees in them evidence of that over-activity of growth which is responsible for the tumour on the acoustic nerve. The tumours of the second group arise from the perivascular connective tissue, and they are associated with hyaline and other changes in the vessel walls. Those of the third group—the true neurinomata—originate, he believes, from the small nerves supplying either the pia or the blood vessels.

The writer also points out the frequency of the presence of ganglion cells in the white matter of the brain in cases of acoustic nerve tumour, and he regards it as an indication of a developmental fault of the type likely to give rise to tumour-formation.

By examination of some more acoustic tumours, the author shows that areas of definite glia may occur in them and also that fully developed ganglion cells may be present. The terminal part of the paper deals with the formation of cysts in acoustic nerve tumours as a result of softening, of hæmorrhage or of oedema and swelling.

J. P. MARTIN.

- [68] The histological proof of diffusion of the cerebrospinal fluid into the pia mater and brain substance in general paralysis (Der histologische Nachweis der Liquordiffusion in der Pia und im Nervenparenchym bei der Paralyse).—GENNERICH. *Münch. med. Woch.*, 1923, lxx, p. 525.

GENNERICH points out that diffusion of the cerebrospinal fluid into the brain substance is one of the most important factors in the pathogenesis of general paralysis and tabes, for it alters the metabolism of the nerve tissue in such a way that the latter, a parenchymatous tissue, can become a prey to a parasite which normally confines itself to interstitial tissue. He conceives the sequence of events in general paralysis thus: In consequence of (inadequate) treatment, the virulence of the syphilitic infection is mitigated, and therefore the body defence-reactions are weakened; hence a very chronic latent syphilitic meningitis arises and leads to adhesions of the pia to the cortex and to a fibrous degeneration (sclerosis) of the pia: in proportion to the amount of this adhesion and degeneration, there is a more or less abundant invasion of the cortical parenchyma by the cerebrospinal fluid, for one of the functions of the pia is to prevent the brain tissue from becoming soaked with the watery liquid which surrounds it.

In order to demonstrate the diffusion of the cerebrospinal fluid into the cortex, the author introduced 17.5 cc. of a one per cent. solution of potassium ferrocyanide by lumbar puncture into the corpse of a patient who had died of general paralysis: he then removed the brain and spinal cord and steeped them for a quarter of an hour in a one per cent. solution of copper sulphate; this produced a reddish brown deposit of ferrocyanide of copper in those parts which had been permeated by the potassium ferrocyanide. Microscopic sections were then made from different parts of the brain, and it was found that at the places where the pia was thickened and adherent, the cortex was infiltrated with copper ferrocyanide to its third or fourth layer; the pia was infiltrated throughout: the blood vessels showed the copper deposit in the medial coats of their walls but not in the intima or adventitia.

Clinical manifestation of the permeation of brain substance by the cerebrospinal fluid is provided by the untoward consequences which sometimes follow the introduction of neosalvarsan into the lumbar theca. Unless the solution is run in slowly under very little pressure, fits and sudden exacerbations of the paralysis are liable to occur, and these the author attributes to a sudden increase of the watery infiltration of the cortex owing to the sudden increase of pressure in the cerebrospinal fluid.

J. P. M.

- [69] The frequency of a positive Wassermann reaction in the cerebrospinal fluid when it is negative in the blood (Die Häufigkeit von positivem Liquor-Wassermann neben negativem Blut-Wassermann).—ESKUCHEN. *Münch. med. Woch.*, 1923, lxxv, p. 527.

EVER since the Wassermann test began to be applied to the cerebrospinal fluid numerous cases have been reported in which the reaction was positive in the fluid and negative in the blood. But the frequency with which this relation occurs has given rise to some argument. In 1920 Kafka, from an examination of 124 cases of general paralysis, found the Wassermann positive in the fluid but negative in the blood, on the same day, in nearly 20 per cent. His figures were quickly challenged by Plaut, who in his records of 1,420 cases of this same disease found no such instances, though there were eight cases (0.6 per cent.) in which the reaction was negative in both blood and fluid. A new factor was introduced into the discussion when Eicke and Löwenberg showed that the inactivation of fluid, by heating it to 56° C. for half an hour, made a great difference in its reaction, a weakly positive one becoming negative and others becoming less strongly positive than before.

Stimulated by the publication of these discordant figures, Eskuchen has examined his records and now publishes his figures not only for general paralysis but for cerebrospinal syphilis and tabes as well. He has found a positive reaction in the fluid when it was negative in the blood in four out of seventy-two cases of general paralysis (5.5 per cent.), in fourteen out of 113 cases of cerebrospinal syphilis (12.4 per cent.), and in fifteen out of 161 cases of tabes (9.3 per cent.). This makes a total of thirty-three cases out of 346 or 9.53 per cent.—a figure which he says surprised himself, for he had excluded all cases which had received recent treatment.

Among his 346 cases diagnosed as mentioned there were in all ninety-seven in which the blood reaction was negative; of these, thirty-three (or 34 per cent.) gave a positive reaction in the cerebrospinal fluid, so that the advisability of testing the fluid when the blood gives a negative reaction is obvious.

J. P. M.

- [70] The characteristics of the cerebrospinal fluid in post-diphtheric paralysis—REGAN, REGAN and WILSON. *Amer. Jour. Dis. Children*, 1923, xxv, 284.

THE cerebrospinal fluid was examined twenty-eight times in each of sixteen cases of post-diphtheric paralysis; twenty-two examinations were made in the first four weeks. Two-thirds of the cases showed generalized paralysis.

The limpidity, tension and Wassermann reaction in all cases were normal. In two-thirds of the cases there was slight increase (\pm to 3 \rightarrow) of the globulin content (method of estimating not stated). The cell count per c.mm. varied from 0 to 10, i.e., was normal. In every case, except one in which the nervous symptoms were minimal, there was a positive colloidal gold reaction. This occurred in the middle zone (lucic), and was slight, rarely reaching 3. It occasionally extended into the higher dilutions. Both globulin and gold reaction became normal as the paralysis disappeared.

M. A. BLANDY.

SENSORIMOTOR NEUROLOGY.

- [71] Two peculiar manifestations of prolonged epidemic encephalitis: respiratory disturbance, insomnia. (Deux manifestations particulières de l'encéphalite épidémique prolongée: forme respiratoire, forme insomniaque).—PIERRE MARIE and Mlle. G. LÉVY. *Revue neurol.*, 1922, xxxviii, 1233.

A. MANY observers have previously called attention to disturbances of the respiratory function in this disease (reference is made to their papers). Symptoms of this nature may be classified as:—

(1) Respiratory disturbances properly so-called. These are: polypnœa occurring either continuously or in nocturnal paroxysms: disturbances of the normal rhythm in the form of occasional or periodic phases of apnœa; and sighing.

(2) Paroxysmal coughing without expectoration.

(3) Respiratory ties (sniffing, blowing and spitting) and abnormal sensations in the nose and larynx.

B. Lethargy is far from being the only disturbance of the normal sleep-rhythm. Insomnia is often encountered in various forms. Invasion of the normal cycle of sleep and wakefulness, retardation of the sleep hour, restless sleep, somnambulism, periodic excitement at fixed hours in the evening, are described in detail.

A series of cases is briefly recorded to illustrate the two groups of symptoms. The paper, which is rich in clinical detail, should be consulted in the original by those interested in the subject.

C. P. S.

- [72] Post-encephalitic contracture of the tongue (Note sur un cas de contracture de la langue post-encéphalitique).—E. CHRISTIAN. *Revue neurol.*, 1922, xxxviii, 1186.

A WOMAN of thirty-two suffered in February, 1920, from a febrile illness diagnosed at the time as influenza. Six months later she noticed an abnormal tendency to muscular fatigue and slowness of movement. Towards the beginning of 1922 her speech became embarrassed at times on account of stiffness of the lips and tongue. Examined in 1922, she showed general muscular rigidity and slowness of movement of the Parkinsonian type.

The most remarkable feature, however, was the contracture of the tongue, which at rest took the form of a ball held between the teeth. The

patient was nevertheless able to move the organ at will and could eat freely. She found difficulty in articulation, especially in the early morning. The mental condition was that which the author considers typical of the post-encephalitic state, apathy and slowing of intellectual effort with preservation of automatic activity and response.

C. P. S.

- [73] **Complete paralysis of the upper part of the face in hemiplegia from an extensive unilateral lesion of the cerebral cortex** (Sur la paralysie totale du facial supérieur dans l'hémiplégie par destruction étendue unilatérale de l'écorce cérébrale).—VEDEL, G. GIRAUD and P. SMIREON. *Revue neurol.*, 1922, xxxviii, 1270.

Involvement of the upper part of the face in hemiplegia, though unusual, has been recorded in a number of cases. The anatomical basis for the more usual escape of these muscles is uncertain. Two hypotheses are mentioned: (1) That the upper neuron supply is bilateral: (2) that the cortical centre for the upper face lies in the angular gyrus with a centrifugal pathway distinct from the pyramidal tract.

The case is recorded of a man of forty-seven, afflicted with renal disease, who suffered from an ictus with complete left hemiplegia. The whole of the left face was involved. Ptosis and a fixed dilated pupil indicated also a lesion of the left third nerve. The autopsy revealed an extensive softening of the right hemisphere, due to a thrombus involving the anterior and middle cerebral arteries and extending back to the internal carotid. The left hemisphere was intact (there is an unfortunate printer's error in the original). In addition a small hemorrhage was found involving the left third nerve at its point of emergence.

In discussing this case the authors quote others in which complete involvement of the face was associated with sudden *extensive* ischemia of one hemisphere, as in wounds of the internal carotid in the neck. They take this as evidence in support of the hypothesis that the centres for innervation of the upper and lower halves of the face are separately situated. If the lesion is sufficiently extensive it will involve both centres, or their pathways. In relation to the ipsilateral lesion of the third nerve they do not refer to the hypothesis long ago put forward by Mendel that the orbicular and frontal muscles are supplied from the nucleus of the third nerve on the same side.

In the light of this hypothesis their case might be capable of another interpretation.

C. P. S.

- [74] **A case of muscular atrophy following chronic myositis** (Über einen Fall von Muskelatrophie im Gefolge von chronischer Myositis).—ZWEIG. *Jahrb. f. Psychiat. u. Neurol.*, 1922, xlii, 100.

THIS paper concerns a patient who, after having suffered from myositis in 1908 and again in 1914, died in 1918 with pronounced muscular atrophy. The attack of myositis in 1914 was severe, lasting three months and causing much pain and swelling in the muscles of the thighs. By May, 1915, the patient was well enough to enlist in the army, and it was not till a year later

that the first symptoms of muscular atrophy came on. Examination two months after that revealed extensive wasting of the muscles of the shoulder girdle and a moderate amount of wasting of the muscles of the left thigh.

His illness ran the course of a progressive muscular atrophy and he died in January, 1918.

Post-mortem, no changes were found in the brain and spinal cord; in the muscles there was extensive atrophy of the fibres; the remaining fibres were very unequal in size, small atrophic ones and large hypertrophic ones being found side by side; the spaces between the fibres were much greater than normally; nuclei, greatly swollen and much increased in number, lay together in rows among the fibres; the intramuscular nerve endings seemed healthy; the interstitial tissue was in places infiltrated with lymphocytes. In the femoral nerve and in the large trunks of the brachial plexus a few degenerated nerve fibres were found, and on that account the author prefers classing his case as one of neuromyositis to one of polymyositis.

J. P. M.

- [75] Huntington's chorea and progressive familial myoclonus-epilepsy (Über Huntingtonsche Krankheit und fortschreitende familiäre Myoclonusepilepsie).—SCHULTZE. *Deut. Zeit. f. Nervenh.*, 1922, lxxv, 319.

SCHULTZE here revives a former controversy as to whether or not Huntington's chorea and familial myoclonus-epilepsy are different diseases or variants of the same disease. Oppenheim and Lundborg took the former view, the author and some others the latter, and so the major part of this paper is devoted to a critical examination of, and an attempt to annihilate, the points of difference between the two conditions. Common to both diseases are the frequency of their familial occurrence, the presence of involuntary twitchings, the frequency of progressive mental defect and a steadily progressive course. But in Huntington's chorea (1) direct inheritance is more usual; (2) the onset is much later; (3) the movements are more comprehensive; (4) the twitchings have more tendency to cease during voluntary movements; (5) the gait is much less interfered with; and (6) epileptic attacks are very much less common than in myoclonus-epilepsy. Schultze discusses these differences one by one and shows that none of them is absolute. Pathologically neither condition is at all clearly defined, so that, although the author devotes some space to them, arguments from pathology have little or no weight.

At the end of the paper reference is made to some other cases of twitching movements and to the so-called 'canine chorea,' but no suggestion is ventured as to their specific pathological basis.

J. P. M.

- [76] The ecology of epilepsy.—C. B. DAVENPORT. *Arch. of Neurol. and Psychiat.*, 1923, ix, 554.

THE aim of this paper is to inquire into the distribution in the human species of the tendency to epilepsy. The author gives statistics (the majority of which are taken from Army Reports), with twenty-eight references, concerning

the prevalence of epilepsy in the following groups: Negroes, Amerindians, Mongolians, East Indians, Philippine Islands, Polynesia, Europe, Great Britain, United States and European nations represented in it.

He concludes that the tendency for muscles, singly or in groups, to undergo tetanic contractions, more or less periodically without obvious cause, is widespread among higher vertebrates. Consequently its causative factors must be conceived broadly enough to include mammals and birds. Hence diet, alcohol, focal infection and trauma may be, and doubtless are, causative factors in particular cases, yet no one of them is the essential factor. The factor that is most nearly universally present is some inherited constitutional peculiarity of the body, so that the tendency for muscles to go spontaneously into tetanus recurs with especial frequency in certain families. It is *a priori* probable that certain strains or races differ in the rate incidence of epilepsy by virtue of either an inherited constitution or a difference in the incidence of one or more exogenous factors, or by virtue of both these causes. In-breeding is a danger in a population where the endogenous factors exist. In general, the statistics indicate that alcohol may be an important exogenous factor and that low rates of incidence are attributable to favourable factors, both endogenous and exogenous.

E. B. G. R.

[77] The pathogenesis of epilepsy.—MICHAEL OSNATO. *Arch. of Neurol. and Psychiat.*, 1923, ix, 488.

THE author reviews the problem of the causation of epilepsy in the light of modern research into the factors underlying the convulsions.

He first considers the possibility of a psychogenic origin, expressing little sympathy with the views of Pierce Clark. The fact that the delirium of 'petit mal' attacks deals with the content of consciousness does not prove a psychogenic origin, since all deliria are similar in this respect. Moreover, epileptic characteristics are possessed by many persons who do not suffer from seizures, and the theory of psychogenic origin cannot be applied to cases with a known organic basis. He hesitates, however, to discard this theory completely because of the work of Crile and Cannon. He invokes the psychogenic factor to account for epilepsy developing under the strain of warfare in a patient operated on twenty years previously for depressed fracture.

The mechanical and vascular theories of pathogenesis, as summarised by Sargent, find more favour. In this case the tonic stage of the fit, which is considered analogous to decerebrate rigidity, is explained by the cutting off of the cerebral circulation, and the clonic stage by the gradual, inefficient resumption of the same. Pike's experiments on cats support this view. Sargent attributes these circulatory disturbances to alterations in autonomic control, but such control of cortical vessels is not yet proved. His theory does not, moreover, seem adequate to account for the development of epilepsy in only 4.5 per cent. of the 18,000 cases of cerebro-cranial wounds reviewed by him.

The observations of Krause, Sherrington, Sargent, Holmes, and others on individuals suffering from Jacksonian epilepsy are briefly referred to and the interpretation of the epileptic fit as a symbolically purposeful act is eliminated

on the ground that the movements produced by faradic stimulation of the cortex are exactly similar to those of the epileptic convulsion and non-purposeful in nature.

Cunéo's work is reviewed at length and his conclusions taken as the most promising basis for further research. Cunéo believes that albumosamia exists in epilepsy. This is caused by an insufficiency of the alkali-forming function in liver and small intestine, by means of which organic salts, which are transformable into sodium carbonate, do not undergo this metabolic change, but enter the circulation and cause a division, under certain circumstances, of the nucleo-histose element of the nucleo-proteids into nucleinic acid and the proteoses. These latter remain free and exhibit their convulsive action. His conclusions are based on: (1) Investigations on the blood and urine of epileptics after seizures; (2) the effect on epileptics of a predominantly protein or predominantly carbohydrate diet; (3) studies, *in vitro*, of the action of intestinal mucosa, combined with liver or pancreatic tissue or bile, on the acid organic salts formed in metabolism of starchy substances; (4) production of nucleinic acid and proteoses by hydrolysis and oxidation of blood serum; (5) development of epileptic convulsions in animals by intravenous injection of the substances thus produced; (6) comparison of the post-mortem findings on these animals with those found in human beings dying in status epilepticus; (7) clinical observations that restricted carbohydrate diet and administration of alkali by mouth give encouraging results in epilepsy.

Reference is also made to Alzheimer's neurohistopathological findings in epileptic dementia. Bacteriological causation of epilepsy is dismissed as disproved, and the importance of heredity emphasized only in the case of mental defectives and paralytic idiots. In conclusion the author states that the factor of importance in epilepsy is the acidosis, regardless whether this depends on a viciously functioning carbohydrate metabolism, which causes a general toxicosis, or upon the local production of the toxic substance from disintegrating cellular structures, secondary to vascular disturbances. The effect is the same: the only difference is the extent of the convulsive reaction.

E. B. G. RIVINGTON.

[78] I.—Clinical features and morbid anatomy of double athetosis in children (Zür klinischen und pathologo-anatomischen Charakteristik der doppelseitigen Athetose des Kindesalters).—I. N. FILIMOFF. *Zeits. f. d. g. Neurol. u. Psychiat.*, 1922, lxxviii, 197.

II.—On double athetosis, with observations on the extra-pyramidal system in children (Über doppelseitige Athetose, nebst Bemerkungen über das extra-pyramidale System im Kindesalter).—ERWIN THOMAS. *Jahrb. f. Kinderheilk.*, 1922.

THE first of these papers represents an attempt to arrive at a more exact localization of the areas involved in the production of hyperkinetic movements. The opening pages contain a short review of the work of C. Vogt, Wilson, Hunt, and other authors. One case of the author's is described in

detail, both as to clinical observations and morbid histology, the latter being illustrated by microphotographs.

The principal clinical features of the case were: constant involuntary movements in muscles of facial and bulbar innervation and distal muscles of extremities; combination of typical athetotic movements with associated movements: preponderance of hyperkinetic over paralytic symptoms.

The results of the microscopical examination are fully described: changes in the cortex were confined to the anterior central convolution on both sides, and consisted of a diminution in number and size of the cells of the superficial layers. Similar changes were found in the corpus striatum, being evenly distributed in the globus pallidus and the putamen-caudate. The thalamus and cerebellum were normal.

The case is considered to fall into the group described by Wilson, Vogt, and Ramsay Hunt. The correlation of individual symptoms of the case with details of the morbid anatomy is fully discussed, and stress is laid on the absence of the changes found by Bonhöffer in the cerebello-thalamic system.

In the second paper Thomas describes a series of five cases, of which involuntary movements were the common feature. Four of these were cases of typical athetosis, associated with pyramidal lesions: in one case the movements were choreiform and myoclonic, and the pyramidal tract was not involved.

The author discusses at some length the extent to which the symptoms shown by these patients—athetosis, spasmus mobilis, chorea—may be attributed to disturbances of extrapyramidal tracts. He considers that there is no real significance in Lewandowsky's distinction between 'athétose double' and 'bilateral hemiathetosis,' and prefers to classify such cases on purely anatomical considerations.

Considerable attention is given in both papers to the significance of associated movements, and the extent to which they may be independent of the accompanying pyramidal lesions.

N. HOEHOUSE.

- [79] *Leontiasis ossea as revealed by x-rays* (La leontiasis ossea d'après des documents radiographiques).—E. LESNÉ and P. DUHEM. *Revue neurol.*, 1922, xxxviii, 1176.

A CLINICAL account with x-ray photographs of a case of this rare condition. The patient, a male, aged fifty-one, first noticed progressive enlargement of the head at the age of eighteen. Subsequently the malar prominences became hypertrophied. No other bones in the body were affected by the disease. At the time of presentation the head measured 66 cm. in circumference. The surface of the hypertrophied bones was perfectly smooth to the touch, but the x-ray showed an irregular, mottled appearance, indicating that the density of the new bone formation was by no means uniform. The thickness of the cranial vault in places attained 2½ cm.

The authors seek to distinguish this condition from Paget's disease because (1) it was confined to the bones of the skull, (2) the appearance of the bones in the x-ray photographs was more spongy than they have seen in that disease.

In searching for other examples of the condition which they describe they have found recorded as leontiasis ossea specimens showing nodular hypertrophy of the facial bones which they believe to be of syphilitic origin. The point of distinction is the smoothness of the surface in true leontiasis ossea.

C. P. S.

PROGNOSIS AND TREATMENT.

[80] Value of treatment in general paresis.—H. C. SOLOMON. *Boston Med. Surg. Jour.*, 1923, clxxxviii, 635.

THE author comes to the following conclusions :—

1. General paresis is an active spirochaetal disorder which, theoretically, can be arrested.

2. Despite a great divergence of opinion as expressed in the literature, there is considerable evidence that long-continued and intensively given antiluetic treatment will arrest the parietic process in a reasonable percentage of cases, especially if begun early in the disease.

3. In the Boston Psychopathic Hospital the experience has been that antisymphilitic treatment is of considerable value in cases of general paresis and that many parieties, even after the onset of marked psychotic symptoms, may recover sufficiently to resume their former occupations for a period of years, in some cases for more than seven years, without a return of symptoms.

4. Remissions may result from the use of intensive intraspinal or intraventricular injections when these apparently could not be obtained from intensive intravenous treatment alone.

5. More potent antisymphilitic drugs and more efficient methods of penetration of the drug into the tissues of the central nervous system may be expected to give better results in cases of general paresis.

6. Non-specific therapy, especially the inoculation of parieties with malaria, is reported in the German literature to give very satisfactory clinical results. It is necessary to keep an open mind at present on the value of non-specific therapy and methods of increasing the patient's immunity.

7. There is reason to believe, both from the reports in the literature and from personal experience, that the parietic process may be arrested, symptomatology halted, and the patients returned to social activities and productive work.

C. S. R.

[81] General paresis: what it is and its therapeutic possibilities.—H. C. SOLOMON. *Amer. Journ. Psychiat.*, 1923, ii, 623.

GENERAL paresis became established as a disease entity with a characteristic pathology in 1904, as a result of the work of Nissl and Alzheimer. As Alzheimer points out, there is rarely any difficulty in differentiating paresis from non-symphilitic brain disorders. However, in the case of syphilitic brain disease the differentiation is by no means so easy. The distinction between chronic tertiary syphilitic meningo-encephalitis and general paresis is at times very difficult, if not impossible. It would seem as if the line of demarcation between these two conditions is one of degree, and that at times the one disorder merges into the other. A pathological study of brains from cases

diagnosed as general paresis shows marked differences macroscopically and microscopically. One may find evidence of true tertiary syphilitic lesions in the form of gummas throughout the brain. Lissauer's type, consisting of focal lesions dependent largely upon the vascular changes, must also be considered. It is difficult to make the diagnosis of paresis from the clinical picture alone. Paresis may assume the characteristics of any form of mental disorder, and the neurological signs may be essentially wanting. On the other hand, many other forms of cerebral pathology may give a clinical picture quite suggestive of paresis, and the aid of serological findings is a necessity. Recent work has established without any reasonable doubt the frequency of spirochaetosis in typical cases, but from the observations of Noguchi and Moore it has been presumed that the spirochaete was in a position that could hardly be reached by antisyphilitic drugs. The work of Jahnel, Jakob, and Valente tends to support the hypothesis that there is a direct relationship between activity of the spirochaete and the pathological and clinical phenomena. The generally accepted rule is that cases of paresis will give a uniformly positive finding in the cerebrospinal fluid, and there are many differential points between paresis and other forms of neurosyphilis. Atypical findings, however, sometimes occur and perhaps more especially so in cases of stationary paresis, or in cases of endarteritis of the cerebral vessels. Just what happens in cases during remission is of great theoretical interest, but has not been satisfactorily established. It is to be assumed that the activity of the spirochaete becomes lessened either as a result of the lack of virility on its part or due to the proliferation of immunity bodies by the host. The writer thinks that it is an erroneous assumption to suppose that paresis is incurable and does not agree with the *dictum* of Head and Fearnside that the spinal fluid does not become negative within six months.

As to therapeutic possibilities, it is believed that some satisfactory results may be obtained in many cases where the parenchymal degeneration is very slight. It is a question as to the possibility of destroying the spirochaete. Two modes of attack present themselves: (1) The use of the anti-spirochaetal agents which will reach the spirochaetes in the central nervous system, and (2) an increase of immunity reaction on the part of the host. There is great difficulty in reaching the deep-lying tissues of the central nervous system, but arsenic gets into the cerebrospinal fluid when introduced into the blood-stream, and such drugs should produce results upon spirochaetes in the meninges and in close proximity to the blood vessels. Solomon and Taft have shown that antisyphilitic treatment produces changes in the histological picture in paresis. The problem is to find the best method of applying such remedies. It may be that where there is damage to the choroid plexus arsenic may more easily reach the cerebrospinal fluid. Aside from simple intravenous or intramuscular medication, there is a possibility of the direct introduction of drugs into the cerebrospinal fluid system. Where the effect is desired upon the brain tissue the latter method is the more satisfactory. Dereum's method of spinal drainage has also to be borne in mind. There is a divergence of opinion as to the results obtained by increasing the resistance of the patient by the injection of non-specific proteins or other

substances (tuberculin, sodium nucleinate, organisms of relapsing fever, or of malaria) which produce hyperleukoeytosis. We must be cognizant at all times of the possibility of the combination of a practically latent neurosyphilis and a psychosis. Though stationary paresis occurs spontaneously only very rarely is it seen so much more frequently in patients that are treated compared with those who are not that one cannot avoid the assumption that treatment was responsible for halting the progression. All observations show that something is accomplished by the antisyphilitic treatment of paretics, although not all that might be desired.

C. S. R.

- [82] **The treatment of disseminated sclerosis by vaccines** (Über Vaccine-Behandlung der Multiplensklerose).—GROSZ. *Jahrb. f. Psychiat. u. Neurol.*, 1922, xlii, 19.

CONSIDERING the good results which are being reported from the pyrexial treatment of syphilitic diseases of the nervous system, the report of the effects of employing a similar principle in the treatment of disseminated sclerosis has, at the moment, a special interest. From 1919 till January, 1922, Grosz treated fifty-nine cases in this way, thirty-nine by means of weekly injections of a staphylococcal vaccine and twenty by weekly injections of typhoid vaccine. The dose injected on each occasion was calculated to produce a febrile reaction. With staphylococci the reaction was rarely severe, but with typhoid cultures it was usually sufficient to make the patient feel ill for a couple of days.

The results are encouraging, 30.6 per cent. of the cases showing great improvement. The author faces squarely the difficulty of trying to evaluate treatment in disseminated sclerosis owing to the natural variations of the disease, and he lays most stress on improvement in cases of the slow, steadily progressive type, which had shown no tendency to remission: eight out of twenty-nine such cases were greatly benefited, a percentage of 27.6.

In twelve patients who have been followed up till the time of publication, i.e., for periods varying between six months and two years, the improvement has been well maintained, and almost all these patients are carrying on their work.

J. P. MARTIN.

- [83] **Hypnotic drugs in affections of the nervous system** (Die Anwendung von Schlafmitteln in der Nervenheilkunde).—F. STERN. *Klin. Wochenschr.*, 1923, ii, 308, 355.

SOMEWHAT at length the author reviews the use of hypnotic drugs in nervous affections, and the risks involved. The following practical recommendations are made. Sodium bromide (3 grams) is advised for neurasthenic sleeplessness, and should be taken some hours prior to retiring. After about a week some days should intervene without the drug, which can then from time to time be again administered. Adalin, bromural, and neuronal are also regarded as suitable, but discontinuance now and again is thought well. In the insomnia of anxiety states codeine phosphate and bromide of soda are advised, afterwards being replaced by luminal, veronal, or medinal. In

extreme mental excitement, hyoscine up to $\frac{1}{2}$ mg. hypodermically is useful, but any stronger dose must be used only with special care, and as soon as possible drugs by the mouth, such as veronal, trional and paraldehyde, should be given instead. In cases of delirium hyoscine is often prompt in its action. Where any organic disease of the nervous system causes sleeplessness, pain is commonly its source, and here it is well to combine salicylates with veronal, or the proprietary drugs, such as veronacetin or codeonal, may be given. In extreme pain pantopon injections may be administered.

D. M.

Endocrinology.

[84] The pathology of the pineal gland (Weiterer Beitrag zur Pathologie der Zirbeldrüse).—Luce. *Deut. Zeit. f. Nervenh.*, 1922, lxxv, 356.

It has been urged by various observers, especially by Schlesinger in Austria and by Sunji Umura in Japan, that the pineal, although in great measure degenerated after puberty, continues to show histological signs of activity up till old age. In that case pathological changes in the gland may give rise to at least three groups of signs and symptoms: (1) those due to disturbance of function of the gland itself; (2) those due to its mechanical action on neighbouring parts of the brain; (3) *x*-ray appearances, i.e., shadow due to calcium deposits in the gland.

With regard to the symptoms of the first group, there is a great deal of uncertainty and contradiction, and Luce does not attempt to unravel the tangle, but passes on to the symptoms of the second and third groups. As the criteria for diagnosis of tumour of the pineal gland, he gives the following: the appearance in a *young subject*, in addition to the general signs of intracranial tumour, of (1) unusual increase in height, exceptional growth of hair, adiposity, drowsiness, precocious sexual development, and perhaps mental precocity; (2) partial ophthalmoplegia, static ataxy; (3) a circumscribed shadow (due to calcium) in the position of the pineal gland.

There are, however, cases of illness of pineal origin in which no tumour is present, and the writer draws particular attention to a group of cases in which young patients some months after a concussion of the brain begin to suffer from vomiting, fits, adiposity, with arrest of growth and of sexual development; no signs of organic change in the nervous system are found on clinical examination, but the skiagram of the skull shows a small irregular shadow in a position corresponding to that of the pineal gland. In such cases, according to Luce, the pineal (in company probably with the pituitary and the grey matter round the aqueduct of Sylvius) has been damaged by the concussion: calcium salts have been deposited in the damaged pineal tissue, and the gland, enlarged by swelling and made heavier by the deposited calcium, presses on the roof of the aqueduct, and thus interferes with the passage of cerebrospinal fluid from the third ventricle. In this way all the symptoms may be accounted for. Some of the cases, one of which is described, respond excellently to treatment with mercury.

Traumatic lesions of the pineal are usually accompanied by traumatic lesions of the floor of the diencephalon and of the hypophysis, but the converse does not hold.

J. P. MARTIN.

- [85] A psychoanalytic study of hyperthyroidism.—NOLAN D. C. LEWIS. *Psychoanalytic Review*, 1923, x, 140.

THERE seems no question that hyperfunction of the thyroid is the essential factor in this syndrome and that an excess of thyroxin is productive of the phenomena, but our knowledge of the pathogenesis and the predisposing factors remains indefinite. The mental symptoms, though long since known, have only recently been emphasized. Many instances are on record where an intense sudden emotional experience has initiated acute hyperthyroidism, but the emotion can only be the exciting cause. Most individuals with hyperthyroidism show all or combinations of the following mental characteristics: (1) Unsustained attention and variation of interest. (2) The thinking processes are quickened. (3) Speech is rapid and of a personal trend. (4) Changing mood. (5) Increased emotional responses. (6) Varying degrees of insomnia. (7) A tendency to develop psychosis, the most common types being (a) confused states, (b) schizophrenic reactions, and (c) paranoid trends. The life-history usually discloses many neurotic manifestations.

This paper attempts to contribute to the study of the hyperthyroid personality and draws attention to certain special features. Herein is given a short account of the analysis of two cases, since it is considered that an analytical study of the biologic factors in force will throw light on the disease. Both these cases exhibited certain common features: (1) An infantile father attachment. (2) Autoerotic cravings with their resulting conflicts during personality growth. (3) In one case unconscious homosexual components were revealed. (4) In both the hyperthyroidism seemed to be a part of the abnormal development of the personality, and some of its signs were present at an early age. There is some evidence to suggest the thyroid may become affected through disorders of the personality and conflicts of trends denied natural expression, with release of this energy through the vegetative nervous system and thyroid. Maranon has pointed out the importance of the hyperthyroid temperament, and he believes that the effect of sudden emotion is to transform a temperamental condition into an active pathologic process. Early psychotherapy is therefore here insisted on, and it is stated that in the two given cases great improvement ensued through analysis.

C. S. R.

- [86] The endocrine factor in mental disease.—L. LEITCH WILSON. *Proc. Roy. Soc. Med. (Sect. Psychiat.)*, 1923, xvi, 21.

THIS paper is interesting in view of the work done in late years to show that a lack of balance in the endocrine system is a possible causal factor in mental disease. The endocrine system appears to have a morphological relationship to a similar system in primitive forms of life where the linking up of the various chemical products, by a circulatory apparatus, fulfils, in the absence of the nervous system, all the adjustments necessary to adapt the organisms to the

environment. The writer holds that the endocrine system, with its constant ebb and flow of chemical activity, its intimate connection with bodily metabolism, and its close relationship with the nervous system, is more fitted to be the originator and controller of human conduct than the central nervous system, which tends to automatic machine-like action.

A brief account is given of the way in which the endocrines govern nutrition, direct sexual development, and play a part in self-preservation.

The author's conclusions are : (1) The primitive instincts, based on the endocrine system; are, in health, harmoniously co-ordinated, each reinforcing or inhibiting the other for the general welfare of the whole organism. (2) The resultant of their interaction is represented by the endocrine balance, and this, acting through the nervous system, determines the affective tone and at the same time energizes and directs or inhibits the bodily behaviour in response to stimuli. (3) The gross changes in behaviour, characteristic of mental disease, have not up to the present been correlated with any definite lesion in the nervous system; therefore it is justifiable to look elsewhere for the underlying cause of mental symptoms. (4) The endocrine glands and their apparently close relationship with the primitive instincts and emotions offer a field of study which may be prolific in results to the alienist as well as to the physiologist. (5) There is evidence that the system of endocrine secretions may be affected pathologically by both psychical and physical causes. (6) The endocrine system may prove to be the mechanism through which mental disease is produced.

C. W. FORSYTH.

Psychopathology.

PSYCHOLOGY.

[87] Freud's theory of wit.—J. Y. T. GREIG. *Brit. Jour. Med. Psychol.*, 1923, iii, 51.

GREIG, though in the main agreeing with Freud's theory of wit, has certain criticisms to offer. To him all wit appears in ultimate analysis to be aimed, i.e., to be tendency-wit. The difference between harmless wit and so-called tendency-wit is a difference only in the degree of precision to which we are able to bring our behaviour. Further, Greig cannot conceive of a mere playing with words as productive of pleasure. It is meaning, not sound, that counts. Thinking or manipulation of thought is not an activity functioning in its own right, or bringing pleasure on its own account. Rather is it behaviour on an upper level, and the end of thought is the aim of the particular instinct in question, e.g., thinking about love is love-behaviour in the form of thought. Thus he asserts manipulation of thoughts for their own sake is mythical; the manipulation is for the sake of achieving some instinctive purpose; and this so far as wit is concerned is generally an aggressive one. Finally, Greig considers that in wit there is no economy of psychic energy; on the contrary, an additional psychic expenditure is demanded. Indeed,

he would attribute the pleasure derived from wit to the effort put forth successfully to overcome resistance.

ALFRED CARVER.

[88] Symbolism in the Chinese written language.—JOE TOM SUN. *Psycho-analytic Review*, 1923, x, 183.

THE study of Chinese writing affords an unparalleled opportunity to gather facts bearing upon the question of symbolism in primitive word formation. In the construction of the character endless illustrations are found of many of the most profound psychoanalytic tenets. The earliest form of writing is that of a simple picture of the idea (pictogram) that it is intended to convey. Many of the signs for such universal subjects are identical in the early Chinese and Egyptian records. When an abstract word was desired the next stage (ideogram) was reached, and this affords instruction in primitive thinking of a most valuable analytic nature. The formation of the character for 'good' is compounded of the separate characters for 'boy' and 'woman,' for to the Chinese mind the possession of a woman and a son represented the greatest good known to man. The character for 'sun' written over that for 'horizon' stands for 'morning.' The character for 'dictionary' is a fine example of unconscious thinking. It is represented by a child under a roof, meaning that makers of dictionaries in order to devote time to such work must be spared the struggle for existence and are, therefore, as children raised under a shelter. To express the meaning still further, so that writing fell but little short of spoken language, phonograms came into use by combining an idea indicator with a sound indicator. It is the combinations that the Chinese mind has resorted to in order to enable it to write a new idea that make the Chinese language one of the greatest repositories of primitive psychology that are available for further research. Such studies afford an intimate insight into unconscious human thought at a period more than five thousand years ago. Many of the mental associations formed by the primitive Chinese are found to be absolutely identical with those of the British of to-day. We speak of a hard-hearted man; the Chinese say he has a 'jewel heart.' The ideogram for 'quarrelling' shows the characters of two women under a roof. The love of the Chinese for the classics and the teachings of their old philosophers is comparable to a narcissistic fixation. An awakening, the like of which no history records, awaits the world when the libido of the Chinese people, now entangled in the intricacies of their writing and fixed at the ideographic period in the evolution of the alphabet, becomes freed and directed towards a socially constructed national enterprise.

C. S. R.

[89] The scope of vocational selection in industry.—J. S. ROWNTREE, JUN. *Jour. Nat. Inst. Industr. Psychol.*, 1923, i, 240.

FOR success in certain occupations too high intelligence may be as detrimental as too low intelligence. Both an increase in the efficiency of the business and a contribution to the success and happiness of the individual worker should be accomplished by vocational selection in industry. Laboratory selection tests may not always fulfil our expectations in the workroom

because new factors may upset the psychologist's calculations, while the latter can never be sure of creating such an incentive as will make every worker reach the level of excellence indicated by the results of the tests which have been applied. The conclusion is come to that we should aim less at finding an individual quite ideally fitted for a piece of work, than at getting the best possible group of individuals into a particular workroom. In seeking to allocate workers to the jobs for which they are best qualified, it is most essential to ascertain their 'mental-motor ratio,' that is, the ratio between their innate intellectual capacity and the control of their motor or muscular mechanism. On this ratio depends susceptibility to fatigue in any particular job. Having found the worker's ratio, he should be placed in such a job as will make demand on him in accordance with it. The ideal task for any man is one which gives free play to, without exhausting, both his mental and motor capacities. When it is felt that work is extremely monotonous or when the worker becomes irritable, nervous and unsettled, it is likely that the job fails to maintain the mental-motor ratio. Monotony is not the characteristic of any particular task, but is a reaction which particular tasks may produce in particular workers. At the bottom of the scale will be those jobs needing workers whose mental-motor ratio shows little intelligence but a considerable bodily endurance. The lowest grade of mentality which a factory could utilize would be included in this group, which would mainly be employed on unskilled labour. As the mentality rises we pass to the semi-skilled worker, then to the skilled worker and hand worker, and finally to the highest grade of clerk and secretary. Any grade above this is at present beyond the scope of vocational tests.

C. S. R.

[90] An experiment on change of work.—G. H. MILES and O. SKILBECK.
Jour. Nat. Inst. Industr. Psychol., 1923, i, 236.

An attempt was made to ascertain the effect of a short period of organized change of work introduced during the work spell when fatigue (as measured by a fall in output) had begun to operate. An increase of output amounting to 14·2 per cent. resulted. The importance of arranging material is emphasized, so that when the worker enters the factory he may start with the minimum of distraction and interruption. Past experiments of introducing rest periods have shown such advantages as relief from fatigue, increased output, and improved health. For its best effect the rest pause should take place *before* the worker *feels* that he is really fatigued, though in such circumstances the rest period may not be fully appreciated. Older workers are frequently of the opinion that time taken off from their work should be at the end and not the middle of a spell, and many resent the interposition of an organized period. After a rest period, too, a certain effort is required to reproduce the attitude of a 'will to work.' If instead of a rest period some change of work is possible which will afford a complete alteration of mental and physical activity, those parts of the organism which have become fatigued are relieved; the worker feels that useful work is being done; and at the same time the effort necessary to produce two distinct changes of attitude is not needed. By introducing a definite 'change period' the investigator aimed at retain-

ing certain advantages of the rest period—the mass effect of all working together and the mass effect of all obtaining relief together—while avoiding several of its disadvantages. It was concluded that its introduction led to increased output and materially reduced fatigue towards the end of each work spell. The experiments made, considered with the opinion of the workers, indicate that a change period is at least as effective as, and is even preferable to, a rest period.

C. S. R.

PSYCHOSES.

- [91] A case of folie à deux (Su di un caso di pazzia a due).—C. CUSSINO. *Riv. di pat. nerv. e ment.*, 1922, xxvii, 447.

A MARRIED couple were brought into the asylum, in Milan, after having been found in a state of great dirt and neglect in a room which they practically had not left for two years. The wife was neuropathic, and her family history unsatisfactory. At the time of the menopause she became suspicious and superstitious. She was inclined to consult palmists, etc., but was afraid to do so till a gipsy apparently foretold the death of her mother. This precipitated her psychosis. She acquired an apparatus which she regarded as her good spirit, who directed her life and told her what to do. She imagined herself in alliance with God against His enemies, and her mission was to defeat these. Finally she developed a tuberculous arthritis and was told by her spirit that she must not leave her room for exactly twenty-four months in order to be cured.

The husband had been an industrious worker, but always under the thumb of his wife, and although he sometimes rebelled against her suspicions and superstitions, she gradually alienated all their friends, and then he submitted to her influence. He also consulted the good spirit and obeyed its dictates, feeling himself drawn into the same struggle as his wife against the enemies of God.

The conditions under which this communicable psychosis develops are enumerated. (1) The superior intellect of one, the active subject, over the other, the passive subject. (2) Community of conditions of life and of moral and material factors. (3) The delusions must be based on something that might be true and confined within the limits of possible conjecture and interpretation. (4) The existence of a suitable predisposition in the passive subject.

That such cases are not merely the result of suggestion is shown by examples like the one described, in which the passive subject, when separated from the active one, does not recover, but slowly progresses to a state of senile paranoia like that of the active subject.

R. G. GORDON.

- [92] Sex development and behaviour in male patients with dementia præcox. —CHARLES E. GIBBS. *Arch. of Neurol. and Psychiat.*, 1923, ix, 73.

The writer records observations on the gross physical sexual characters of 325 male patients suffering from dementia præcox. He also gives the percentage of married patients in 343 cases, and studies the problem of sexual

development from the point of view of sexual behaviour in 137. His findings are summarised thus :

1. The testes of dementia præcox patients first admitted to the hospital between sixteen and twenty years of age compared favourably in size with those of patients first admitted between the ages of twenty-one and forty.

2. Pubic hair of a definitely feminine distribution was present in 13 per cent. of patients first admitted between the ages of sixteen and twenty, and was still present in 13.4 per cent. after they were twenty-one years of age or over, but was found in only 2.6 per cent. of those first admitted between the ages of twenty-one and forty.

3. A definite deficiency of beard occurred more frequently in patients admitted early than in those admitted late. This deficiency persisted until after twenty-one in 34.6 per cent. of those first admitted between the ages of sixteen and twenty, and was still present in 21 per cent. of patients first admitted between the ages of twenty-one and twenty-five, when those showing the deficiency had reached an average age of 25.8 years.

4. Deficient development of the secondary sexual hair did not depend on the size of the testes, being associated with rather large testes as frequently as with small ones.

5. The marriage rate of males developing dementia præcox was definitely below that in the general population.

6. Adult sexual relations with the opposite sex had never been accomplished by 64.1 per cent. of 120 dementia præcox patients, who answered the questions in a satisfactory way.

7. Only 20.5 per cent. of the patients had reached an adult level of sex behaviour and maintained it for even a short time, either married or single.

E. B. G. R.

[93] The physiologic level in dementia præcox.—THEOPHILE RAPHAEL.
Amer. Jour. Psychiat. 1923, ii. 515.

THERE is definite indication of variant status physiologically in the acute and exacerbative phases of dementia præcox as compared with the so-termed adjustive types which, aside from such factors as persistent initial hypoglycæmia and glandular features, seem to show no essential departures from the normal. In these acute or clinically active cases this deviation is manifested through delayed sugar-tolerance, indicative of disturbed glycogenic and glycogenolytic functions, altered epinephringlycæmic response, relative hepatic hypofunction, relative hypolipæmia, evidence of depressed basal metabolism and increased blood cell fragility—findings in their ensemble definitely suggestive of a basic hypo-oxidative status, a state of general metabolic depression. In addition there is autonomic dysfunction or instability predominantly of the vagotonic order. The disorder may conceivably represent reaction to exo- or endotoxæmia, or other intrinsically neuro-organic situation to which the metabolic change may be secondary, though the endocrine situation may be the fundamental one. In all probability the association is one of essential concomitance. The matter of physical or psychic primacy is of interest but obscure. One might

postulate a certain somatic vulnerability as regards the endocrino-autonomic field, which, under the stress operative upon the psychic level, may become clinically manifest as described. This seems plausible in view of the marked amelioration determined by conflict subsidence and the frequency with which endocrine stigmata are established in præcox types. As to difference in reaction among the basic types in dementia præcox, there seems to exist no definite distinction among the really acute forms.

C. S. R.

[94] **Types of word-association in dementia præcox, manic-depressives and normal persons.**—GARDNER MURPHY. *Amer. Journ. Psychiat.*, 1923, ii, 539.

1. THE study of 250 normal, 120 dementia præcox, and 82 manic-depressive cases, by the method of classifying associations according to logical relationship between stimulus and response, shows in every case overlapping of the groups, and in most cases no significant differences in central tendencies. The normal group gives far fewer 'co-ordinates' and far more adjective-noun associations than either of the pathological groups, but the latter groups do not differ significantly from each other.

2. Rhymes and sound associations appear to be slightly more characteristic of the manic-depressive group than of dementia præcox.

3. Responses in the form of proper names and responses using the first personal pronoun do not appear to be particularly characteristic of either disorder.

4. Responses of the 'value-judgment' type appear with equal frequency in samplings taken from the two main groups.

5. Responses which consist in merely changing the word-form of the stimulus appear to be definitely characteristic of very excited manics.

6. The associations of both pathological groups resemble those of normal adults very much more than they resemble those of children. A special study of 'individual' reactions shows no striking difference in their classification in the pathological groups; in a few cases, the two normal groups vary in the same direction from the pathological groups.

7. The above conclusions seem to confirm the work of Kent and Rosanoff, who state that "a large collection of material shows a gradual, and not an abrupt, transition from the normal state to pathological states." The present data justify no conclusion as to the possibilities of the association experiment in the field of detailed analysis of particular associations. The suggestion is offered that types of word-association, as such, are but little related to the fundamental attitudes and adaptations to life underlying the mental disorders which are here compared.

C. S. R.

NEUROSES AND PSYCHONEUROSES.

[95] **The organic basis of the hysterical syndrome.**—F. L. GOLLA. *Proc. Roy. Soc. Med. (Sect. Psychiat.)*, 1923, xvi, 1.

THE writer holds that in the study of the symptomatology of hysteria all that is given to us is a disorder of conduct, and that the disorders of the bodily

mechanisms by which conduct is expressed should be investigated by the methods of experimental physiology. The disorder of the mechanism of conduct must precede the evolution of the hysterical syndrome. "We are justified in assuming an organic disability as an antecedent to every neurosis, and in employing methods for the objective evaluation of organic efficiency in looking for it . . . there is little room to doubt that a similar organic basis will be discovered for all psychoses."

The physiological responses to a noxious stimulus are described, the most important being the diminution of skin resistance, the psychogalvanic reaction. This affective reaction cannot be modified by voluntary effort, and is elicited by both external noxious stimuli or by the arousal of some disagreeable circumstance. In the hysterical subject there is a greater or less enfeeblement, or even a virtual suppression, of the psychogalvanic reaction, although there may be a great show of emotion. The counterfeiting of rage or grief is unaccompanied by the electric signs of activity of the affective mechanism. It seems probable from these observations that hysterical behaviour is purely imitative. The hysteric, being deprived of the affective reaction, has resource to other forms of expression more or less distantly connected with the feeling of unpleasantness. The symptoms really constitute a method of self-expression, primarily for egoistic and secondarily for social needs, which has been conditioned by an organic disability of the mechanism of affection, the great terminals of which are thought to be in the thalamus.

The writer holds, though many will disagree with him in this, that the loss of affection is the cause of the abnormal suggestibility of the hysteric. "Our strongest bond with logical reality is that furnished by the feelings or emotions, for these constitute our strongest defence against the irrational. Mind, dissociated from feeling, is very much at the mercy of any suggestion."

It is interesting to note that while the affective galvanic response tends to increase in magnitude with advancing years, the tendency to hysterical manifestations gradually fades after the twentieth year.

C. W. FORSYTH.

[96] A case of ambulatory automatism.—H. DOUGLAS SINGER. *Arch. of Neurol. and Psychiat.*, 1923, ix, 347.

THE author gives an account of a male patient with a remarkable history of fugues, illustrating the underlying mechanism, which appeared to be escape from situations intolerable to the sensitive personality. Memory for the periods of automatism was recovered without hypnosis, though hypnoidal states occurred in connection with free association.

The outstanding features of the personality of this patient were restless energy combined with a sensitive, timorous conventionality. Coupled with associations of childhood, the former led to a craving for change and adventure which was held in check by the latter. The navy offered prospects of a successful compromise, which was shattered by illness with resultant intense resentment. At the same time, alcohol was offered as a substitute and served to allay the disappointment. With returning health this was discontinued, but a recurrence of the illness and its accompanying fears, serious psychic trauma, exhaustion and an accidental dose of whiskey led to an effort to escape

by a blind return to excessive drinking. Following this first fugue, the craving for excitement and escape from the trammels of his inhibitions reappeared at intervals, and a feeling of illness offered a justification for a resort to alcohol, under the influence of which he gave way to sexual excesses, and finally married.

To escape the consequences, the patient first drank until he developed delirium tremens, and then disappeared on a prolonged fugue. Subsequent difficulties had been reacted to in the same manner. The reason for the recovery of the real personality was not always clear, but was usually due to the occurrence of an illness or an accidental injury.

E. B. G. RIVINGTON.

- [97] **A study of the mechanism of obsessive-compulsive conditions.**—PHYLLIS GREENACRE. *Amer. Jour. Psychiat.*, 1923, ii, 527.

IN a group of eighty-six cases of obsessions, phobias and compulsions appeared to take place in three ways:—

(a) The balancing of a simple wish against fear of the results of gratification (usually where the personal wish is in conflict with the social demand).

(b) The transference of the affect from its genuine source, which is repressed because of the revulsion aroused, to some neutral associated object or topic which forms a part of the original situation, and is then avoided or dealt with as though it were the total experience.

(c) The substitution of a symbolic thing or action for the original wish against fear conflict.

The obsessive-compulsive tendency in the management of life situations usually begins early in the individual's life, adult psychoses of this character usually being preceded by a variety of similar, less florid symptoms arising from early childhood experiences. These may be in themselves the beginning or source of the adult reaction, or may lay down a reaction-pattern or tendency.

C. S. R.

- [98] **Trichotillomania** (Sulla tricotillomania).—A. COPPOLA. *Riv. di pat. nerv. e ment.*, 1922, xxvii, 601.

THIS condition has been variously regarded as a mild peculiarity of conduct or a symptom of dementia præcox.

Three cases are described in detail, and those recorded in the literature are discussed. Some of these were associated with prurigo, and it is significant that many cases showed definite signs of mental disease, especially of dementia præcox. It has also occurred in general paralysis, in one case depilation of the beard being a symptom of a general attempt on the part of the patient to change himself into a woman. A few cases have been associated with melancholia, when they formed part of a general masochism. Neither skin conditions nor toxic influences, though sometimes present, are sufficient to account for the phenomenon, and if all cases are not actually psychotic they are certainly neuropathic. It almost always manifests itself for the first time at an early age, though there may be long remissions. On the whole the author thinks that there are two distinct types, one occurring in the various forms of dementia as an incidental symptom, while the other occurs in sub-

jects of normal or almost normal intelligence, and is a particular form of obsessional neurosis or tie. It is probable that the latter type will be seen more often in a dermatological than in a psychiatric clinic.

R. G. GORDON.

PSYCHOPATHOLOGY.

[99] **Homosexuality and alcoholism.**—ROBERT M. RIGGALL. *Psycho-analytic Review*, 1923, x, 157.

FREUD states that homosexual men have a strong mother-fixation, and that all normal people show a considerable measure of latent or unconscious homosexuality. The inversion component of bisexual development subsequent to puberty becomes wholly repressed or sublimated, but the writer endeavours to show that alcoholic excess hinders its sublimation. Homosexuality exists in animals, especially in captivity, and in the human race is the undoubted result of civilization. It can hardly be accepted that the perversion is either completely congenital or completely acquired. Many types are alluded to by different writers, and Ferenczi draws a hard and fast line between the active and the passive. He declares that the passive represents a true intermediate sexual stage, and that the active type suffers from an obsessional neurosis. The former is comparatively rare. Analytic results are not very encouraging, but the heterosexual side can be developed and strengthened. Capacity for heterosexual intercourse is no proof of normal sexuality, and Don Juanism may even be proof of an individual's homosexuality. The study of narcissism tends to show that the homosexual sees himself in his love-object as in a mirror. In the psychosexual history of the passive type an inverted Œdipus complex may be found where the boy wishes to take the mother's place to gain the father's affection. Here the child soon manifests his effeminate character, over-represses his anal interests and develops an exaggerated love for perfumes. The male aggressive type under-represses his anal-erotic activities and may be coprophilic. A severely corrected heterosexual act in childhood may have led to dread of the opposite sex. The connection between active homosexual tendencies and sadism must be noted, as well as the part it plays in the pathogenesis of paranoia. Stanford Read, who noted paranoid states commonly in his war work, suggested that the herding together of large numbers of men may have thus aroused latent homosexuality.

Alcohol increases homosexuality by removing various resistances, but other conflicts are uncovered through regression to various levels of psychosexual development. Sadistic and masochistic tendencies may be released, and many brutal crimes are committed during intoxication. Frequently an apparently exaggerated state of heterosexuality will be a cover for homosexuality. Those women who drink will frequently show inverted tendencies, but whereas men drink to overcome the repression of natural homosexuality, women are more likely to drink in order to bring out the male side of their sexuality. Alcoholics frequently become impotent and are subject to false ideas of jealousy. The male alcoholic becomes unfaithful, and projection causes him to think that his wife is such, while by the further projection of his homosexuality he accuses his wife of being in love with the men he

himself loves. True dipsomaniaes are compelled to drink through some unconscious factor, and the initial anxiety is the result of sexual conflict and repression. A faulty psychosexual development is, therefore, the keynote of the whole drink problem. Alcoholism is the result and not the cause of neurosis. A case illustrating many of these points is briefly quoted.

C. S. R.

[100] The ontogenesis of introvert and extrovert tendencies.—ALICE G. IKIN. *Brit. Jour. Med. Psychol.*, 1923, iii, 95.

HUMAN civilization tends to increase individual powers of subsistence with relatively small fertility; in other words, there is a predominance of ego over sex instincts, or, according to Jung, introversion rather than extroversion. To avoid the sacrifice of the race to the individual, nature appears to have supplied man with a stronger sex instinct than is required for reproduction. Freud states that the conflict resulting from this is between ego and sex instincts, and Jung believes that it is between introvert and extrovert reactions. There is more in common between the views of Jung and Freud on the theory of the libido as an essentially psychic force than the difference in terminology would lead one to expect. Jung does not admit that desexualised primal libido can never be restored to its original function. Freud and Jung both admit a sexual force capable of sublimation or desexualisation, and a force which is *innately* desexualised, both believing that they are not mutually convertible forces. Jung should therefore refrain from tracing the origin of both of them to one of them. Freud and Jung both believe that evolution is the history of conflict between the non-sexual individualising derivative and the sexual undifferentiated reproductive force, repetition of this conflict occurring in the individual. The authoress believes that since neither the individual nor the race is to be sacrificed, the compromise must be a new product differing from, but including, egoism and sexuality. She believes this product to be altruism, and in this respect differs from Freud, who considers that the libido can never be altruistic. She thinks that the term 'altruism' should be reserved for the higher sublimation of both interest and libido, and considers Freud has ignored the fact that libido is responsible for race-preservation interests when he states that object interest is the only altruism. She amplifies the definition of sublimation, which, according to her view, should mean "*the deflection of the energy motivating any instinct into social instead of egoistic channels.*"

Neither the school of Freud nor of Jung appears to recognize the complementary nature of their views concerning the conflict between narcissistic and object libido. Introvert-extrovert conflict appears to be that existing between narcissistic and object libido. The repressing force appears to be narcissistic libido focussed on the ego-ideal. The force of conscience is derived from libido embodied in the ego-ideal, which ideal is a social product. Freud and Adler fail to see that both egoistic interest and libido are repressed as antagonistic to an ego-ideal, their cases supporting their respective views. The authoress concludes by referring to her own analysis and states in a foot-note that she suffered from dissociations of personality. She discovered that in the

breaking-down of transference the ideal of the object was identified with the self. She passed through a stage of the formation of an idealised image of the object, the libido being detached from the object to the ideal, and, secondly, of identification of the ideal with the self.

ROBERT M. RIGGALL.

- [101] The 'reality-feeling' in phantasies of the insane.—HENRY DEVINE. *Brit. Jour. Med. Psychol.*, 1923, iii, 83.

THE author starts with a description of a case in which he was able to observe the development of delusions in their early stages. He states that this case throws some light on delusional formation and the belief of these patients in the reality of their phantasies. The patient exhibited memory visions connected with noble birth and associations with the royal family. The grandiose delusional attitude developed later from these earlier visions, and the patient became a typical paraphrenic. In this case of an intelligent adult the foster-parent phantasy found expression in a delusional form. The difference between the wish-fulfilment foster-parent phantasy of the child or psychoneurotic, who enjoys it although knowing it to be imaginary, and the psychotic, is that the latter knows it to be real. Like the phantasy which is built up from memory images, the foster-parent delusion is probably a massive revival of similar phantasies in childhood. The abnormal character of the phantasy is constituted in the feeling with which it is invested. The difference between phantasy and delusion is important but elusive, and, in the case quoted, it is just this vague quality of the phantasy which constitutes the difference between insanity and the neurosis. Stress is laid on the non-volitional character of the images in the mind of the psychotic. This patient did not wish to be great, but "greatness was thrust upon him." The development of the delusion is compared to the development of an instinct. Delusions symbolise the working of unmoral primitive impulses, and, in this instance, express omnipotence and egoism. The onset of the delusion often results in a cessation of tension and appears to supply a fundamental need. It is unfortunate that no psychotherapeutic method is able to prevent the development of delusional trends. Examples of the primitive instincts which control the psychotic are found in the hallucinatory personality which overshadows the patient (sadistic impulse) and also in the homosexual impulse of the paranoiac. The behaviour of these patients is the logical outcome of their biological inferiorities.

ROBERT M. RIGGALL.

- [102] The causal factors of juvenile crime.—CYRIL BURT. *Brit. Jour. Med. Psychol.*, 1923, iii, 1.

THIS article gives a survey of the causation of juvenile delinquency in a series of 187 children (123 boys and 64 girls), 400 non-delinquent children of the same social status being used as a control group. The data thus arrived at are carefully tabulated, and the question of sampling error is briefly discussed. The inquiry shows that, excluding mental deficiency, heredity has only an indirect influence upon delinquency, but that the home environment is of paramount importance. Physical factors again seem to bear only an indirect

relationship to crime ; their real influence is exerted through the mind, for anything that weakens health or induces a feeling of inferiority diminishes self-control, heightens irritability and induces antisocial outbreaks. Psychological conditions are found to be supreme both in number and strength, and, of these, emotional factors are more significant than intellectual ones. Emotionally delinquents are preponderantly of the 'repressed type,' but the inhibitory feelings of pain, sorrow, fear, etc., are conspicuous by their absence. Burt, however, is doubtful as to the *rôle* played by repressed complexes in producing delinquency, since psychoanalysis so far as it has been undertaken discovers practically identical complexes in normals. The inquiry as a whole supports the view that crime in any given case nearly always is attributable, not to any single cause, but to a multiplicity of factors—that is to say, there is no such thing as a distinctive criminal type.

ALFRED CARVER.

Reviews and Notices of Books.

Problems in Dynamic Psychology. By JOHN T. MACCURDY. Pp. xv + 383. 1923. Cambridge University Press. 12s. 6d. net.

LITERARY criticism of Freudian theories in the past has been largely conspicuous for its unscientific and patently prejudiced attitudes. Dr. MacCurdy is an avowed disciple of Freud, and for many years has studied and applied therapeutically the psychoanalytical principles involved. Such an authority with a wide reputation gives us a scientific criticism of psychoanalysis with suggested formulations which, however much they may differ from those of the orthodox school, must be thoughtfully dealt with. As the writer points out, some knowledge of psychopathology is necessary for a proper understanding of the text. The purpose of the book is twofold. "On the one hand, it is an attempt to show from demonstration of the limitations and inconsistencies of Freudian formulations that a broader system is needed, while, on the other, an attempt is made to outline some tentative hypotheses to make good this need." It seems that much of the criticism is directed at the material contained in the American translation of Freud's *A General Introduction to Psychoanalysis*, which was so inaccurately rendered as to be highly misleading, and though MacCurdy states that reference to the original was in places necessary, it is a matter of doubt how much he did so refer. Had he used the later English translation he would have been on safer ground.

It will be well to refer mainly to those points upon which the writer shows most difference of opinion. He starts off by regarding Freud's use of the term 'unconscious' as being frequently ambiguous, and takes as an example of this the use of the word in the conflict between the unconscious sex-impulses and 'resistance,' resistance being not part of the unconscious but of the ego. He says "a component of the ego, therefore, of which consciousness is not aware, which operates unconsciously and can only be recognized by the technic of psychoanalysis—this is not part of the unconscious." Such an example, he thinks, is not isolated, and he would prefer to abolish the term 'fore-conscious' to avoid confusion. Though 'wish' is employed throughout, it is thought to have an anthropomorphic tendency, and 'instinct-motivation' is preferred as more scientific. Much fault is found with Freud's instinct theory and his wholesale application of the principle of hedonism. It is denied that an instinct can be reversed into its opposite or turned against the subject, and doubt is expressed even that an instinct can be sublimated, for more likely another instinctive factor enters in, or one here deals with an ideational modification. Infantile sexuality is thought to be more akin to 'organic pleasure,' and in the development of object-libido it is regretted that altruism, which may be more potent than

egoism or narcissism, is much neglected by Freud. That primal sex phantasies may be inherited seems to be a highly dangerous concept to invoke in a system of psychopathology where autogenetic factors are all-important. In the Freudian theory of repression anthropomorphism is again seen as rife, and the ego "is represented as something which both flees and repels at the same time and by the same process—an impossible view." MacCurdy sees much obscurity in various passages concerning this 'ego,' which he states is frequently employed as an equivalent for personality, and also for instincts of preservation. Resistance is part of the ego, but unconscious. How can it co-operate in psychoanalytic treatment? Narcissism in many respects is not adequately differentiated from egoism and self-preservation, and the concept of dementia praecox in terms of narcissism is freely criticized. The relation of persecutory delusions to homosexuality is denied in an unqualified fashion. Freud's theory of the psychological mechanisms productive of the symptoms of melancholia is regarded as 'a creditable bit of speculation' which does not fit the facts. It is not admitted that loss, real or unconscious, is the invariable precipitating cause of depression, and it is said that the theory has been built up on a study of a small number of cases of 'reactive depression,' which is a mixed psychosis. MacCurdy is disappointed at the lack of light Freud throws upon the study of emotions, and in his making fear the centre of all his psychopathology. That fear should have its basic root in the act of birth is regarded as a preposterous notion. The writer can accept but little of the libidinous origin of fear, and believes that to get this emotion the instinct of self-preservation must operate.

The orthodox theory of dreams also meets with much adverse criticism. An alternative theory should be considered, viz., that we sleep in order to dream and to enjoy another type of psychic activity, and it is not considered necessary to presume any abeyance of the censorship when the day-remnants make content with unconscious processes. The validity of universal-symbolic language is questioned, and also it is doubted whether day-remnants have anything to do with dreaming as such. "The incomprehensibility of dreams is largely a matter of the selectivity of memory process by which continuity is established between the imaginary experiences of the night and the real ones of the day. It is more a matter of dream destruction than of dream work."

In the technique of psychoanalysis MacCurdy sees much unconscious suggestion at work, but regards this as little or no drawback, since as long as sufficient unconscious energy is deflected from outlet *via* symptoms to outlet in constructive activities recovery takes place. Actual observation fails to confirm the psychoanalytic theory of autoerotism, and the characteristic adult reactions to early exaggerated autoerotic impulses are strongly denied. Trigant Burrow's ideas of the 'primary subjective state' and 'primary identification' are regarded as highly helpful in the classifying of many psychopathological problems. The well-known theories of Rivers are considered at length and, though considered full of error, are thought to be extremely stimulating.

The latter half of the book is devoted to the pragmatic conceptions of instincts and their classification. Thus the ego, sex, and herd instincts, with

their motivations, are discussed, and their co-operation and conflicts dealt with. These chapters constitute MacCurdy's constructive formulations as opposed to the destructive criticism in the earlier portion of the volume. Much of this later material appeared in the report of a symposium of the American Psychopathological Association, which was published in the *Journal of Abnormal Psychology* (vol. xvi, No. 4, October, 1921).

Though there is a great deal in the contents of this book which Freudians will vehemently dissent from, in that evidently there has been some misapprehension of the pioneer's real meaning, the fact that a psychiatrist of repute has frankly demonstrated what to him appear as ambiguities and difficulties in accepting Freud's views can only be helpful to those who are themselves struggling for a clearer conception of psychoanalytic doctrines, and who perhaps are less able to sum up their own scientific uncertainties. As such theories extend and are modified, they undoubtedly become more and more difficult for the average mind to grasp, as so much of the abstract always must be. The later constructive chapters make easier reading, and will be found stimulating to all psychopathologists. To discuss here the various points raised is not feasible, and we have contented ourselves with only mentioning the important ones. It is patent how much these pages are the product of reflective thought, and few readers will not be the wiser for a careful consideration of them.

C. S. R.

A Psychological Retrospect of the Great War. By W. N. MAXWELL.
With a Foreword by Professor JOHN LAIRD. Pp. 191. 1923. London :
George Allen and Unwin, Ltd. 6s. net.

IN these pages an attempt has been made to give "an answer to the questions which many men have asked themselves regarding their reactions to the environment of war" and "to show the late war as a great educational experience, the results of which are still being felt." The writer was a chaplain at the front who was not only in close touch with the manifestation of the various emotional forces engendered by the war environment and circumstances, but who made excellent use of his opportunities for observation. He opens well with a discussion of the fundamental conceptions of psychology, in which he takes up a dynamic and behaviouristic attitude, recognizing behind consciousness great instinctive tendencies and unconscious processes which furnish the motives for most, if not all, human conduct. Though in the main he is a follower of McDougall, whom he frequently quotes, he goes further, and sees behind instinct a primal *élan vital* as a basic urge, and also differs to some extent from that psychologist's views on the 'group mind.' In subsequent chapters he deals at some length with the war impulse, danger instincts at the front, sentiment at the front, courage, the unconscious mind, and the influence of group life upon the individual in the army. He concludes that "the quality of the education supplied by the war—whether it was beneficial or the reverse—will depend both upon the nature of the dispositions aroused and, more especially, upon the degree to which they were organized within the mind." It is at once evident that the author has excellent psychological insight, that he has read widely, and moreover has added original

thought and critique of no mean order. The volume is interestingly and lucidly compiled, and it is certain that not only will the intellectual laity find much therein that is instructive, but that psychologists themselves will read it with advantage.

C. STANFORD READ.

Hypnotism and Suggestion. By LOUIS SATOW. Translated by BERNARD MIALLE. Pp. 240. 1923. London: George Allen and Unwin, Ltd. 10s. 6d. net.

WE can hardly agree that this volume supplies a long-felt want, or that its perusal will in any way enable the reader to follow and understand the recent developments of psychoanalysis, though such statements herald its publication. The main bulk of the contents is devoted to a description of the history, theory and practice of suggestion and hypnosis, but nothing original is given us. For the explanation of hypnotic phenomena we have to be content with an old physiological theory akin to that put forward by Heidenhain in 1880; no modern views on suggestion are found, and we are asked to accept the statement that "by continual repetition all the functions of the brain are reduced to automatism" as the key to its understanding. Chapters follow upon mass suggestion, psychical epidemics, and the applications of suggestion to monarchism, militarism and war. The writer sees in suggestion an influence which has been the basis of all that is harmful in civilization, and makes deductions which are far from scientific. For some unknown reason a glossary is appended mainly composed of psychoanalytic terms, concerning which nothing is found in the book. Any one desirous of gaining knowledge about hypnotism and suggestion would do well to seek the aid of more authoritative sources.

C. S. R.

The Power within Us. By CHARLES BAUDOUIN. Pp. 134. 1923. London: George Allen and Unwin, Ltd. 3s. 6d. net.

THIS small volume is evidently intended for the reader who has previously interested himself in the author's late works on cognate subjects, and must be regarded as an attempt to apply his views towards a general adaptation to life. The exposition is more popular than scientific. Seven chapters deal with such themes as: thought as an agent; the physical bases; personality and free development; the inner life and individualism; concentration; emotional forces; effort and courage; personal ascendancy. It need hardly be said that autosuggestion is looked upon as an important dynamic force, and much credit placed at the door of the so-called 'New Nancy School.' The style is diffuse and by no means lucid, and though the book may be appreciated by some who are content with a loose presentation of the subject, to the earnest student of psychology its pages will in no way appeal. A short bibliography is appended.

C. S. R.

The Mind and what we ought to know about it. The People's League of Health Lectures. By various contributors. Pp. 252. 1923. London: Hodder and Stoughton, Ltd. 6s. net.

MANY of us doubtless would greatly differ in our opinion as to what 'the

people ' should know about the mind, but it certainly would be conceded that in any such popular lectures a pragmatic point of view should be adopted, though much that is theoretical may stimulate reflective thought and thus ultimately be beneficial. It seems that this volume largely lacks that practical aspect which would materially aid the unversed reader. Dr. Bernard Hart, in discussing the primitive instincts in the human mind, does, however, simply but interestingly give a useful insight into the everyday motivating factors of instinctive, emotional and reasoning conduct which will be essentially useful in its applications. Dr. Cole deals more or less purely with physiology, and states that stress must be laid on this aspect of psychology because there is a tendency for the public to dwell unduly on occult phenomena. Much which would be of great interest for instruction is neglected for the details of nerve-paths. The same criticism applies to Dr. Rows' lecture on 'association of ideas, memory and recognition.' Dr. Maenamara on 'habit and adaptation' keeps to well-worn paths, and so does Sir Robert Armstrong-Jones on 'fatigue and sleep.' Neither writer touches any helpful modern ideas, but the latter startles us with a story of a boy who died on the fourth day after experimentally keeping himself awake! 'Mind and body' is dealt with by Sir Frederick Mott, and lectures of special value on 'crime and delinquency' and 'mental deficiency,' by Dr. Potts and Dr. Tredgold respectively, conclude the volume. With certain exceptions, we feel that much has been said about the mind which was of little value, and much that might and should have been said is wanting. Education in such matters is sadly needed, but it must be on more useful and practical lines.

C. S. R.

Psychoanalysis and Suggestion Therapy: Their Technique, Applications, Results, Limits, Dangers and Excesses. By WILHELM STEKEL. Authorized translation by JAMES S. VAN TESSLAAR. Pp. xi + 155. 1923. London: Kegan Paul, Trench, Trubner & Co., Ltd. 6s. 6d. net.

WE do not know to what extent the author identifies himself with the publisher's descriptive notice of the volume on the book-cover, but great exception must be taken to statements made thereon, more especially that "the book is designed for the busy practitioner and the sufferer from 'nerves,' " which is confirmed in the translator's preface. In order to reap any advantage from the perusal of these pages the busy practitioner would require to have considerable previous knowledge of the theory and practice of psychotherapy, and that nervous sufferers should seek for help herein is advice which can only be productive of harm. The writer himself tilts against the desirability of neurotics reading books on the subject, and baldly states that "there is altogether much too much irresponsible talk about psychoanalysis carried on in public and in the press." We heartily agree with him, and cannot help but feel that in this volume he has been somewhat guilty of it himself. We already have too much literature of a certain type, and though nothing but praise can be given to some of Dr. Stekel's popular essays upon psychoanalytic themes, we feel he has prostituted his acknowledged high reputation

in putting forward this book. The contents are divided into three parts: the first is devoted to the technique and applications of psychoanalysis and psychotherapy: the second to the final results of psychoanalytic treatment, and the third to psychoanalysis, its limits, dangers and excesses. The author's style is, as usual, attractive, and his confident and dogmatic assertions are alluring, though not a few statements are made which are obviously fallacious. Bearing in mind to whom this book is recommended, we cannot pass by such assertions as: "Excellent results are achieved in cases of psychic impotence, when verbal suggestion is often all that is necessary": "Stuttering is curable in a short time": "Startling results are also achieved in the treatment of epilepsy" (all on page 41): "Homosexuality is curable through psychoanalysis" (page 43): "Paranoia, during its earliest phase, may occasionally, though not always, be corrected": and with regard to the psychoanalytic treatment of dementia praecox "an attempt may be made" (page 45). All of these statements are misleading, mainly incorrect, and dangerous reading for the 'busy practitioner.' Many points in the author's dream interpretations will startle his unversed reader, especially when he is asked to accept point blank certain homosexual symbols (burning point = anus, page 58). Much in the book is suggestive and of value, though the egoistic attitude taken up throughout becomes at times a little repellent, especially when Freud is seemingly belittled. Because of the excellent work which Dr. Stekel has done in the past we wish he had not penned these pages. His enthusiasm is appreciated by psychopathologists, but his literary profusion may, we fear, defeat its object.

C. S. R.

Insanity and the Criminal Law. By WILLIAM A. WHITE. Pp. ix + 281. 1923. New York: The Macmillan Company. \$2.50.

This volume embodies the opinions and conclusions which the writer has come to from his extended practical work as a psychiatrist at St. Elizabeth Hospital, in Washington, which has a criminal department for prisoners suffering from mental disease. Dr. White feels that the psychiatrist has the sort of experience in dealing with the practical social problems of human behaviour that entitles him to speak with some authority, and that the time has arrived for the law to take some cognizance of what has been accomplished in the building up of the modern concept of mental disease. In order that the main subject-matter, as indicated in the title, may be adequately understood, the author extends his discussion considerably beyond this limit. He deals from the psychological standpoint with such themes as crime, the criminal, expert testimony, prejudice, responsibility, punishment, and we have as well chapters upon the principles of criminology, the function of the criminal law, the nature of the law, the functions of the medical expert, the tests of insanity, and legal suggestions for betterment.

It is shown how the law to-day only represents the vengeance of the individual taken over by society, that in many ways the criminal psychologically is a scapegoat for our own unconscious impulses, that criminology must be studied in the light of an individual-society relationship, and that the growing tendency to study the individual offender and not the crime

must be furthered in order to make any scientific progress in criminological problems. Most illuminating are the remarks made upon medical expert testimony, and the attitude taken up by the law in relation to it. Under the heading of "A chapter of blunders" cases are cited as evidence of "how completely the law fails to meet present-day social needs and scientific demands in dealing with the criminal classes." Constructive formulations are suggested which, if acted upon, would bring the legal and scientific aspects of the problem much more in unison. To all modern psychopathologists the present legal views and practice in relation to responsibility and insanity are anachronistic, and this excellent and readable contribution should be productive of educative advance, and is highly welcome from such an authority as Dr. William White.

C. S. R.

The Psychology of Laughter and Comedy. By J. Y. T. GREIG, M.A.
Pp. 304. 1923. London: George Allen and Unwin, Ltd. 12s. 6d. net.

A PLEASANTLY written book, which escapes the lamentable dullness so often associated with heavy-handed psychological incursions into the delicate world of laughter and wit.

The author, in his preface, mentions two authorities to whom he is chiefly indebted, Sully and Freud, but it is clearly the work of the latter which has mainly influenced the development of the theory forming the central theme of the book. This theory, which is reached by a careful analysis of simple examples of laughter, commencing with its manifestations in the infant, may be described as follows. Laughter is a response which arises within the behaviour of the instinct of 'love' when an obstruction of some kind is first encountered and then suddenly overcome; it marks the escape of psycho-physical energy mobilised to meet the obstruction, but not actually required for that purpose, and therefore for the moment surplus. 'Love' here corresponds fairly closely to Freud's 'sex.' In a succession of chapters this formula is applied to various types of laughter, wit and the comic. Many of the applications are plausible and sometimes convincing; a few are strained and likely to arouse considerable scepticism.

A useful appendix contains a historical summary of the numerous theories of laughter which have been proposed by various authors, and there is an extensive bibliography.

B. H.

Conflict and Dream. By W. H. R. RIVERS, M.D., F.R.S., etc. With a preface by G. ELIOT SMITH, F.R.S. Pp. xi + 195. 1923. London: Kegan Paul, Trench, Trubner & Co., Ltd.

THIS book contains the substance of a course of lectures delivered at Cambridge and elsewhere, and it had been Dr. Rivers' intention to revise the manuscript and to alter its form. Owing to his untimely death, however, the task was never completed, and the arrangement and publication of the lectures has been undertaken by Prof. Elliot Smith, who has also contributed a preface and an appendix.

Rivers' views are essentially based on those of Freud, but the theory

which he puts forward differs from Freud's in several important respects. These divergences may be briefly summarised as follows : The function of the dream is not necessarily to express a wish-fulfilment, but to attempt the solution of a conflict. The nature and degree of the accompanying affect are determined by the extent to which the solution presented is satisfactory or the reverse. The conflicts in question are recent and do not generally belong to an infantile period. Although, however, the content of the dream is not infantile, its mechanism is constituted by a regression to the modes of thought and emotional expression belonging to an earlier period of life, due to the fact that in sleep the higher and recently developed modes of mental activity are in abeyance, and more primitive modes, which are usually suppressed in adult working life, are allowed free play.

It will be seen, therefore, that Rivers' theory of the dream is closely similar to that which he has developed with regard to the psychoneuroses in his *Instinct and the Unconscious*. The theory is built up and exemplified by the analysis of the author's own dreams, and of others provided by his patients. These analyses are in most cases at least plausible, but the arguments are not always convincing and occasionally wander into speculations of a somewhat unprofitable type. The main positions are, however, clearly and ably presented, and the book is without doubt a valuable contribution to the literature of the dream.

B. II.

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MALIGNANT SPHENO-OCCIPITAL CHORDOMA.

BY J. LE F. BURROW AND M. J. STEWART, LEEDS.

I.—INTRODUCTION.

CHORDOMA, a tumour arising from vestigial remains of the primitive notochord and undergoing similar evolutionary changes, is one of the rarer and less well recognized varieties of neoplasm. A sufficient number of cases, however, are now on record to show that it is a definite entity, having a distinctive histological structure, and, in many cases at least, fairly characteristic naked-eye appearances. The literature of the subject, already fairly considerable, has recently been reviewed by one of us (Stewart,²³ 1922), and it will suffice to say here that of the twenty-six cases there referred to, in fifteen the tumour was situated in close relation to the sphenoid-occipital synchondrosis, and in nine it originated in the sacro-coccygeal region. Of the remaining two, in one the tumour was in the superior occipital region, in the other there were several tumours, situated in the jaws. Since the publication of this paper, several other sacro-coccygeal cases and one sphenoid-occipital case (Lemke,¹⁹ 1922) have been put on record, and it remains true to say that chordoma arises almost solely in relation to the extremities of the primitive notochord, and that in rather more than half the cases the tumour springs from the *clivus blumenbachii*.

Sphenoid-occipital chordoma is, therefore, a rare disease, and the case now reported is, so far as we can ascertain, only the seventeenth on record. It is also the first to be published in the British Isles. Quite possibly, of course, cases of chordoma of the *clivus* have occurred

in which the true nature of the tumour has not been recognized, and a pituitary origin cited, since clinically the symptoms most easily fall into line with those caused by the pressure of a pituitary growth. It may be stated, however, that a search among a large series of cases of pituitary tumour published by Cushing and others has revealed only a single case in any way suggesting a chordoma in pituitary disguise (Cushing,⁷ case 17).

A short abstract of the present case has already been published (Stewart and Burrow,²⁴ 1923). We now propose to describe it in detail and to compare it, both clinically and pathologically, with previously reported cases.

II.—CLINICAL RECORD.

The patient was an ex-soldier, thirty years old, and of good physique, who was invalided from the Service on account of gas poisoning by phosgene, after serving for three years in France. He first came under our observation on November 30, 1921, when he was confined to bed in hospital, the symptoms on admission being cough, breathlessness, a sense of oppression in the chest, more or less constant headache, blindness in the left eye, loss of power in the legs, and unsteadiness when attempting to stand upright.

Personal and Family History.—He had no relatives living except a sister, who was married and in good health. The parents died of chest trouble, but the details were unknown. He was unmarried, denied lues, and had never ailed in any way since the infectious illnesses of childhood.

History of Present Illness.—The patient was quite clear that his health was good up to the time when he was gassed by phosgene while on active service in France in the winter of 1917. He admitted that he had had headaches for several months before this, but these he attributed to war conditions at the front. After the gassing he made a slow recovery in hospital. When he had been out of bed a few weeks and was going about again, he noticed that his head was continually aching, though not in a severe or paroxysmal manner. The headache he described as being throbbing in nature, worse on exertion, or when he stooped down. The breathing never entirely recovered from the time of the gassing: he wheezed, and was short of breath. Occasionally there was vomiting, but this was not a prominent symptom, and was not mentioned by him until he was asked the leading question. Early in 1920 he noticed that the vision of the left eye was much impaired: he discovered it by accident one day when he had closed the right eye and found that he could then see very little with the left eye alone. From that date the left eye gradually became blind, and vision failed totally in this eye during the spring of 1921. The sight of the right eye had failed somewhat, but he was still able to read large print when examined by us. From the spring of 1920 he became unsteady on his legs and found it a great effort to walk far, as they were awkward and weak. This loss of power gradually became more pronounced, so that his walks were shorter and shorter, and in the summer of 1921 he gave up walking altogether. In the early months of

that year he had noticed that the movements of his right hand were becoming impaired. There had been some difficulty for several months before this in handling small objects with the fingers, but from the spring of 1921 the weakness of the hand became steadily more pronounced, and by late in the summer his left hand also was quite noticeably affected. He had to take to bed in the autumn, a few weeks before he came under our observation, owing to unsteadiness in his balance, and increasing weakness of the legs. He was examined by one of the writers (J. le F. B.) on November 30, 1921.

Condition on Examination.—The man was propped up in bed breathing in a slow, laboured fashion very like the type of respiration seen in the later stages of diabetes immediately preceding the onset of coma. He presented definite cyanosis of the lips, ears, etc., and spoke in short, badly articulated sentences, pausing to breathe between them. There was a little audible wheezing, but this was not marked, and it was apparent that the dyspnoea was not due to obstruction of the respiratory passages. The legs lay extended on the bed as in flaccid paraplegia, but some motor responses were obtained when he was asked to lift first one and then the other from the bed. The arms differed from each other in posture. The right arm was adducted with the elbow extended, the forearm pronated, the wrist and fingers slightly flexed. There was œdema of the right hand and forearm. The left arm was carried more naturally, with the elbow semi-flexed and the hand resting on the chest when not in action. The intrinsic muscles of both hands, especially the right, showed some wasting, evident in spite of the œdema, but not more than could be accounted for by disuse. The head was held slightly retracted, and any active or passive movement caused pain. The most defective movement was flexion of the neck, but there was no tenderness on percussion over the cervical vertebrae. The speech was slurring and indistinct, though he was perfectly conscious and did not repeat syllables; the condition was evidently one of dysarthria. Memory and attention were excellent, and there had never been any spasms or convulsions.

Cranial Nerves.—I. The sense of smell was impaired in the left nostril, but intact in the right.

II. Sight was completely lost in the left eye; he could not even distinguish light from darkness. The fundus showed optic atrophy without any evidence of past choked disc. The visual acuity of the right eye was reduced; large print only could be made out. Rough testing of the visual fields showed a reduction on the temporal side as compared with the examiner's normal field. The fundus showed similar changes to those in the left eye, but to a much less degree.

III., IV., and VI. The pupil on the left side was dilated and immobile. There was quite definite paresis of all these nerves on the left side. The right pupil reacted sluggishly to direct light and also slowly to convergence. There was slight weakness of the right third nerve and probably of the fourth as well.

V. Sensibility on the face and in the mouth was unimpaired. There had been no facial neuralgia. The left corneal reflex was sluggish, the right normal. The muscles of mastication were all working so far as could be made out.

VII. The face lacked expression, but there was no paresis of the muscles or difference in the range of movement on the two sides. Taste was normal.

VIII., IX., X., XI., XII. No definite involvement of any of these nerves was made out, although during the last few days of life speech was very defective, and the patient had difficulty in swallowing solids. It was difficult to test the sterno-mastoids and trapezii owing to the pain caused by movements of the neck. The tongue was steady, but he could not protrude it to the full extent. The larynx was not examined.

Upper Limbs.—The right arm could not be lifted above the head, abduction from the side was badly performed, and flexion of the elbow was defective even when the weight of the limb was counteracted. The finger movements were badly performed, especially those dependent upon the action of the intrinsic muscles of the hand. There was no complete paralysis of any muscle or group of muscles. The biceps, triceps, supinator and wrist jerks were obtained on both sides, a little more easily on the right than on the left. On tapping the extensor tendons a slight finger flexion response was present on both sides. The left hand and arm could be moved fairly well, but there was some weakness of the proximal muscles.

The abdominal and epigastric reflexes were abolished.

Lower Limbs.—The legs lay extended on the bed with the feet in a position of mild "drop-foot." There was no complete loss of power in any muscle, but motor power seemed depressed without any segmental selection. The right leg was certainly weaker than the left.

The knee jerks were both normally present, the right a little more lively than the left. The ankle jerks were both easily obtained, and again the right was more lively than the left. There was no clonus. The plantar reflexes were extensor in type, giving a well-marked Babinski's sign on both sides. Gordon's and Oppenheim's signs were also positive.

The Organic Reflexes.—His swallowing difficulty towards the end of life has been already noted. Rectal control was present, but there was urinary incontinence.

The Cerebrospinal Fluid.—The pressure was slightly increased, but the fluid was perfectly clear and colourless. There was no increase in globulin, sugar was present, lymphocytes were present in normal numbers. The Wassermann reaction and Lange's gold sol test were both negative.

Diagnosis.—The provisional diagnosis made before death was tumour in the pituitary fossa with backward pressure on the pons, and forward growth involving the optic tract.

Progress.—The patient gradually became worse. The left hand lost power comparatively rapidly, the respirations became more shallow, and he died while one of the writers was at his bedside on the morning of December 5, 1921. The immediate cause of death was respiratory failure. The pulse continued to beat slowly and deliberately for nearly two minutes after the last respiration had ceased.

The Post-mortem Examination was made next morning, but apart from the tumour at the base of the skull and the notable pressure effects on the

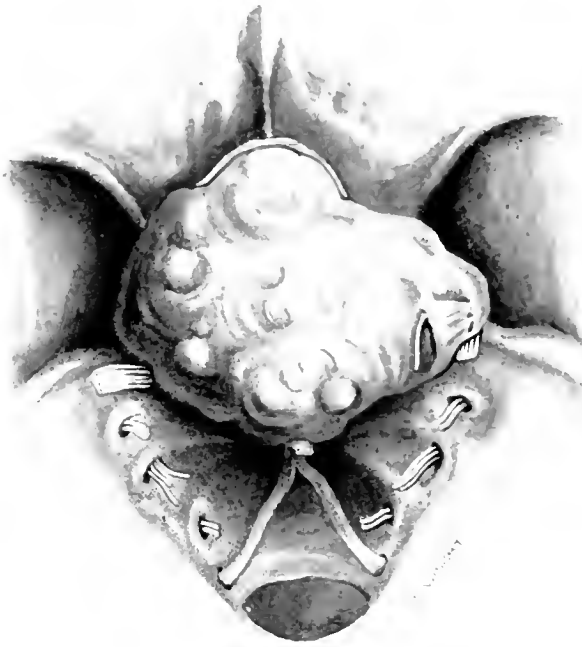


FIG. 1.—Malignant sphenooccipital chordoma. Base of skull, showing tumour springing from the region of the dorsum sellae and pituitary fossa. The stretched and flattened optic nerves and chiasma are seen in front.

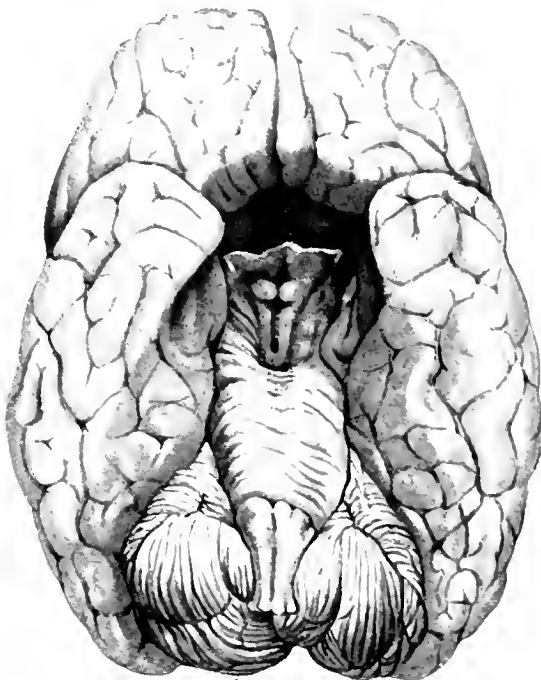


FIG. 2.—Malignant sphenooccipital chordoma. Inferior aspect of brain, showing the deep depression caused by the tumour, and the stretching, flattening and distortion of the pons, crura cerebri, optic tracts and chiasma which resulted.

brain and nerves, nothing of note was found. In particular, the respiratory tract appeared to be healthy.

III.—DESCRIPTION OF TUMOUR AND BASE OF SKULL.

The central area of the base of the skull was occupied by an irregularly nodulated, ovoid tumour about the size of a hen's egg, or slightly less (*Fig. 1*). Its long axis, measuring 6.5 cm., lay transversely, while its antero-posterior diameter was 5.5 cm., and it projected upwards about 3.5 cm. from the base of the skull. Its anterior margin overhung the orbital plates and was practically in line with the most anterior part of the greater wings of the sphenoid. Posteriorly it overlapped a line joining the internal auditory meatuses, while the lateral margins of the tumour were almost in line, antero-posteriorly, with the same apertures. The tumour was irregularly bossed on the surface, and, while its intracranial part appeared completely clothed with dura, this membrane was so much thinned over the bosses that the greyish, semi-translucent, jelly-like tumour tissue showed through. On the other hand, there was no evidence that the dura mater had been penetrated at any point, and the pia mater and brain did not appear to be invaded, nor were they adherent to the surface of the growth. Here and there a number of yellowish brown areas were seen, the result of degenerative changes and old hæmorrhages within the growth. The anterior part of the tumour contained a large, dark purplish area, the result of recent hæmorrhagic extravasation.

Although it could not be definitely distinguished by the naked eye, the pituitary gland was situated on the antero-superior aspect of the tumour, just behind the optic chiasma, which could be seen in front. The tumour had evidently lifted the hypophysis completely out of its bed, causing it to become greatly flattened and stretched in the process. On its inferior aspect the tumour had extensively infiltrated and destroyed the central portion of the base of the skull, notably the basisphenoid and ethmoids, the sphenoidal sinus being filled with growth. It did not appear to have invaded the nose or pharynx.

IV.—DESCRIPTION OF BRAIN.

There was an extraordinary degree of distortion and displacement of the central portion of the base of the brain, including the pons and crura cerebri, the optic chiasma and floor of the third ventricle generally (*Fig. 2*). All these structures were stretched out over the tumour at the base of the skull and elongated, flattened, and grossly distorted in consequence. At first sight there appeared to be a large cavity at the base of the brain, deepest in front, in the region of the interpeduncular space, and shallower behind, in relation to the pons and medulla. The optic chiasma was flattened out to about a millimetre in thickness. The cerebral peduncles were elongated antero-posteriorly, as were all the structures in the interpeduncular space. The pons especially was flattened, stretched and distorted, more particularly on the left side. The medulla was hardly, if at all, involved. With the exception of the optic nerves and tracts, which showed severe pressure effects, it was very

difficult to determine to what extent the first six cranial nerves were implicated. The remaining cranial nerves did not appear to be involved.

V.—HISTOLOGY.

Numerous blocks taken from different portions of the growth showed the same type of structure throughout. The tumour was alveolar, being broken up into masses of various sizes by narrow strands of dense fibrous tissue.

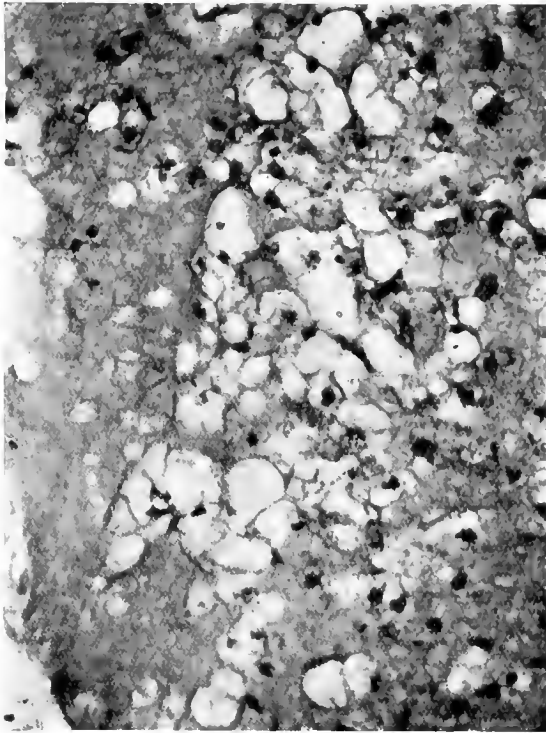


FIG. 3.—Microphotograph showing chordoma cells with extreme vacuolation of cytoplasm: typical 'physaliphorous' cells. ($\times 200$.)

These carried the blood vessels, the alveolar masses of tumour tissue being devoid of both stroma and vessels. Everywhere mucoid degeneration was in progress, and the cells varied in appearance according to the stage which the mucoid change had reached. (1) In the younger, more cellular part, where mucoid change was least marked, the cells were spheroidal, ovoid or polygonal, and in loose contact with one another. They varied considerably in size, but none of them were very small. Nearly all showed some degree of cytoplasmic vacuolation, owing to the presence of droplets of mucin, and as this increased in amount the cell increased in size, until it assumed more or less the appearance of the "physaliphorous" cell of Virchow (*Figs. 3 and 4*). The nuclei of

the younger cells were large, vesicular, and rich in chromatin, but as the intracellular mucin increased in amount the nuclei became smaller both relatively and absolutely. A few giant, hyperchromatic nuclei were seen, suggesting anaplasia and malignancy, while occasional mitotic figures also occurred. No nuclear vacuolation was present, such as has been found in other cases of chordoma. (2) The next stage in the evolution of the cells was that the mucin droplets were discharged, either flowing together forming homogeneous

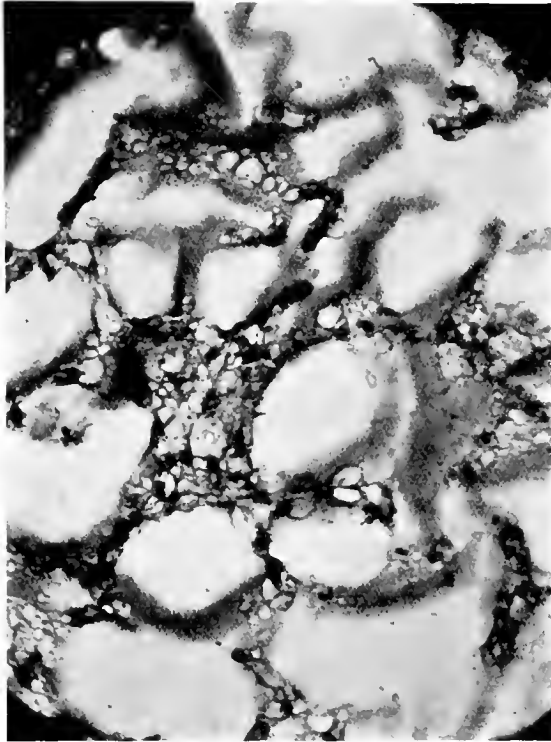


FIG. 4.—Another portion of the growth, showing both cytoplasmic vacuolation and the gaps formed by accumulation of intercellular mucin.

masses of varying size throughout the growth (*Fig. 4*), or simply forming a vacuolated or actually fibrillated groundwork, breaking up the tumour tissue into little groups of cells. The latter, having discharged their contents, then shrank, becoming stellate or even spindle-shaped, but more often remaining irregularly rounded or polygonal. Each consisted of a nucleus still of considerable size surrounded by a scanty layer of eosinophilic cytoplasm. The centre of some of the larger tumour nodules was completely occupied by a homogeneous or granular mucinous mass containing few or no cells.

By the use of polychrome methylene blue, thionine blue and similar stains, it was found that both the homogeneous masses and the intracellular

droplets gave the staining reaction of mucin. The blue cytoplasmic granules, so striking a feature of the more embryonic cells in Stewart's case of sacrococcygeal chordoma, were here very inconspicuous, probably because there were very few young cells present. Most of the cells showed at least a considerable degree of mucoid degeneration.

There were both old and recent hæmorrhages into the tumour at various points, the former being indicated by extensive deposits of hæmosiderin in the stroma.

VI.—RÉSUMÉ OF LITERATURE.

1. The first published case of chordoma of the clivus giving rise to clinical symptoms was that of Klebs¹⁶ (1864). The patient, a man in middle life, died following a series of tetanic convulsions.

2. Klebs¹⁷ (1889) also published the second case, where death was due to pressure on the medulla.

3. In the female mental patient, aged fifty, recorded by Grahl¹³ (1903), the history extended over three years before death, and there was paralysis of the third, fourth, and seventh cranial nerves, dysarthria and dysphagia, with death from paralysis of the medullary centres.

4. Sciffer's²² (1905) patient was a woman, aged thirty-three. The duration of the illness was four years, and the symptoms were those of intracranial pressure, headache, vomiting, and vertigo, followed by left hemiparesis and death from pressure on the medulla.

5. The case of Fischer and Steiner¹¹ (1907) was that of a schoolboy, aged sixteen and a half years, who complained of pain on moving his neck. This had existed for six months, and had been getting worse. The left arm and left leg were weak, and sensation was defective. There was a left claw hand. There was ankle clonus on the left side, with exaggerated tendon reflexes. The provisional diagnosis was tuberculosis of the spine, with pressure on the cord. Later there developed weakness of the right arm and leg also. The left eye was deviated to the left and the pupil fixed, but the face was unaffected. There was double optic neuritis. Dysphagia was present but no vomiting, while the breathing was deep and laboured. The patient died suddenly, calling out, "I am dying."

6. In the case of Linck²⁰ (1909), that of a middle-aged man, there was a swelling the size of a pigeon's egg in the pharynx, associated with right middle ear disease, for which an operation was performed. A month later a second operation was carried out, and slimy material, which proved to be chordoma tissue, obtained. The neurological findings were a diminished sense of smell, total paralysis of the left sixth nerve, diminution of the left corneal reflex, paresis of the left facial nerve of lower neurone type, left recurrent laryngeal palsy, weakness of the left trapezius and atrophic paralysis of the left half of the tongue. The remaining cranial and spinal nerves were intact.

7. The case of Frenkel and Bassal¹² (1910), which is very fully reported, was that of a farmer, aged thirty-nine, who had had symptoms for one year, viz., headache of frontal type followed by vomiting, vertigo, diplopia, and left ptosis. The external muscles of the right eye were normal, but reflexes to light and accommodation were lost. The visual acuity was $1/4$. Œdema was limited to the papilla. The left eye was blind, the fundus showing more œdema than on the right side, but no atrophy. The left second, third, fourth, and fifth nerves were paralysed. There was a lower neurone paralysis of the right seventh nerve. There was no motor or sensory loss in the trunk or limbs. Knee jerks were slightly increased. The cerebrospinal fluid was under slightly increased pressure, but was otherwise normal. The right eye gradually became involved in the paralysis. Death was preceded by coma and Cheyne-Stokes respiration. Post-mortem, the tumour measured 6.5 by 5 by 3 cm., and extended from the optic foramina to the foramen magnum.

8. Jelliffe and Larkin¹⁵ (1912) reported the case of a woman, aged thirty-six, whose symptoms extended over eight months before death. There was left hemiplegia, paralysis of the second, third, fourth, sixth, and seventh nerves, and paresis of the eighth and ninth on the same side. Epistaxis occurred from an extension of the tumour into the ethmoids.

9. Eitel⁹ (1911) recorded the case of a man, aged forty-four, who for one and a half years before death had had symptoms of brain tumour compressing the pons.

10. Wegelin²⁵ (1911) published the case of a woman, aged twenty-five, who died with signs of pressure on the pons and medulla.

11. Hässner¹⁴ (1912) noted the symptoms of dizziness, diplopia, severe headache and optic neuritis in a man aged thirty-two, who died after four years, and in whom the tumour was verified post-mortem.

12. Kotzareff¹⁸ (1918) recorded a fatal case in a man aged fifty-one. The symptoms—headache, pain and spasms in the hands and arms, and optic neuritis—had existed for nine months.

13. Daland⁸ (1919) reviewed the literature and reported the case of a woman, aged thirty, who had had symptoms for three years. There was hoarseness, with headache and swelling of the right side of the neck. There was old choked disc in the right eye, the vision of which was normal. There was a bulging into the right auditory canal. The right side of the tongue was distinctly anæsthetic. There was right recurrent laryngeal palsy, and loss of power in the right trapezius and sternomastoid. The right side of the tongue was atrophied. The tumour in the neck was everted, and its connection with the base of the skull established. Recurrence took place in spite of X-ray therapy. The patient was alive at the time the paper was published.

14. Fabricius-Möller¹⁰ (1919) reported the case of a boy, aged sixteen, who had had a pharyngeal tumour for seven years. Removal was

followed by recurrence in a few months, but a second operation was not performed until four and a half years after the first.

15. Argand⁵ (1918-19) reported the case of a man aged thirty, who was admitted to hospital with all the signs of a ponto-cerebellar angle tumour. At operation a tumour the size of an almond was found on the middle of the clivus, encroaching a little on the right side.

16. Lemke¹⁹ (1922) reported the case of a woman, aged forty-five, of whom there was no clinical record. Inquiry after death showed that twelve years before there had been ptosis and right facial palsy, and ten years before, squint and diminution of vision. The latter symptoms had been much worse for the last six months before death. During this time there was also left-sided paresis, dysphagia, and polydipsia. A malignant chordoma of the clivus was found post-mortem. Both the brain and the pituitary were infiltrated by the growth.

VII.—CLINICAL COMMENTARY.

The comparatively long history of about two years' symptoms, or even a little longer than this, is a feature of these cases. In sacro-coccygeal chordoma the average duration of the ailment has been much longer, viz., nine years, because the anatomical relations of the latter site are more favourable to the continued life of the patient. The symptoms of our patient, and in other recorded cases, have been, in general, those of a slowly growing tumour at the base of the skull. Headache, giddiness and eye symptoms have been the earliest manifestations, followed later by paralysis of various cranial nerves. When the pressure extends to the pons and medulla, there are added to the above-mentioned symptoms hemiparesis, or even paresis of all four limbs, and respiratory or other bulbar complications ending in death.

Diagnosis.—The slow history, with symptoms and signs of a tumour about the pituitary fossa without marked signs of pituitary derangement, should lead the neurologist to recall the possibility of chordoma of the clivus. A good X-ray film taken with the aid of a Potter-Bucky diaphragm, or similar apparatus for minimizing the secondary radiations from the tube, may show evidence of bone absorption, or the outline of the tumour, though apart from the microscope the exact pathology must remain obscure. In a few cases it will be possible to make a histological diagnosis by curetting, or puncturing, local extensions of the tumour at the base of the skull (cf. Daland's case).

VIII.—PATHOLOGICAL COMMENTARY.

The case here described illustrates very well the salient pathological features of chordoma, a lowly malignant tumour of slow growth, locally

invasive and destructive, and only rarely giving rise to metastases. The tumour tissue is intensely gelatinous or mucoid, and is prone to focal hæmorrhage and necrosis. The histological appearances are equally characteristic. The tumour is composed of large solid alveolar masses of cells, very many of which show cytoplasmic vacuolation, with, here and there, large extracellular collections of mucinous material, formed by the fusion of extruded droplets. The whole mass often presents a syncytial aspect, with complete loss of outline of the individual cells.

The histology and histogenesis of chordoma have been investigated with great thoroughness by Alezais and Peyron and their co-workers in France, and their results are embodied in an admirable series of papers extending over the last nine years (Alezais and Peyron¹ (1914),² (1914),³ (1920),⁴ (1922), and Berard, Dunet and Peyron,⁶ (1920)). In their latest paper, based on the study of four personal and five other published cases, Alezais and Peyron⁴ emphasize the varied yet highly characteristic histological picture which this tumour may present. (1) The commonest and fundamental type is the vacuolar, which is well exemplified by the present case. This special vacuolation, intra- as well as inter-cellular, is associated with the presence of an amorphous or granular substance which, from its reactions, would appear to occupy a position intermediate between mucin and collagen. Alezais and Peyron further suggest that certain histological aspects of this material favour the hypothesis that it may become directly transformed into collagen. All the other histological dispositions are rare, but any of them may exist alongside the one already mentioned. They include (2) regular cavities lined by prismatic or cubical epithelium, the homologue of the primitive notochordal canal; (3) solid columns of epithelial cells, which may or may not be vacuolated; (4) a sarcoma-like formation of fusiform or polymorphous cells, with a sarcoma-like relation to the fundamental intercellular substance; and (5) a gliomatous type of structure, due to the development of very fine neuroglia-like fibrillæ between the cells of the syncytium. Alezais and Peyron believe that these different appearances correspond to the classical stages of evolution of the primitive notochord: first a hollow epithelial tube, then a solid cord of undifferentiated epithelial cells, and, finally, the vacuolation and fibrillation which indicate its adaptation to a supporting rôle.

The fact that no instance of a chordoma has yet been described as occurring along the course of the dorsolumbar spine has been taken to indicate that these tumours do not arise from the nucleus pulposus of the intervertebral discs themselves. Rather it is suggested that they arise from those notochordal vestiges which were long ago shown by Müller²¹ (1858) to occur in relation to the spheno-occipital synchondrosis, and which Peyron (unpublished observation) has lately demonstrated to be

of frequent occurrence in the last coccygeal vertebra of the early human fœtus.

In its anatomical characters and topographical relationships the case here reported is almost a replica of Frenkel and Bassal's, except for the absence of extension to the nasal cavities. There was no post-mortem evidence that metastasis had occurred, and this is in keeping with most of the published cases, both spheno-occipital and sacrococcygeal. The encapsulation of the tumour on its intracranial aspects, and the absence of infiltration of the brain and soft membranes are in accord with the relatively low malignancy of the growth.

The relation between the frankly neoplastic chordoma and the little jelly-like nodules occasionally met with on the clivus is discussed in the following communication, "Echordosis Physaliphora Spheno-occipitalis."

IX.—SUMMARY.

The case is recorded of a man, aged thirty years, suffering over a period of three years from the symptoms of headache, vomiting, unsteadiness of gait, failing vision, and weakness of the limbs, especially the right arm. Examination revealed optic atrophy in the left eye, early atrophy in the right eye, paresis of the third, fourth and sixth cranial nerves on the left side, rigidity of the neck, moderate increase in the tendon jerks, and double extensor plantar responses. Death ensued from respiratory failure. A large tumour springing from the clivus blumenbachii, compressing the optic tracts, crura cerebri, pons, etc., was found post-mortem. Histologically the tumour had the characters of a chordoma of low malignancy.

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ECCHORDOSIS PHYSALIPHORA SPHENO- OCCIPITALIS.

BY M. J. STEWART AND J. LE F. BURROW, LEEDS.

THE occurrence of small, transparent, jelly-like nodules projecting into the interior of the skull from the middle of the clivus blumenbachii (dorsum sellæ) was first described by Luschka² in 1856. In the following year Virchow⁸ gave a detailed and illustrated account of the condition to which he applied the term "Eechondrosis physalifora," in the belief that the protrusions were of cartilaginous origin and nature. Müller³ (1858) first suggested a notochordal origin, and adduced important embryological and anatomical evidence in support of this view, but it was not until nearly forty years later that Ribbert⁴ (1894),⁵ (1895), brought forward the final proof of the theory. In addition to studying a series of five cases of speno-occipital eechondrosis (as it was still called), and drawing important conclusions therefrom, he successfully reproduced the condition in rabbits by puncture of the intervertebral discs. This was followed by hernia of the nucleus pulposus, and the nodule of tissue so formed showed evidence of cellular proliferation after a time, and a definite increase in size. After a year it had become largely absorbed, but its histological structure accorded so closely with that of the speno-occipital protrusions already described that there could be no doubt as to the identity of nature and origin of the two formations. Ribbert proposed the term 'chordoma.'

Except for the case of Klebs, where the tumour was the direct cause of death, all the examples of 'eechondrosis' so far reported had been casual findings in the post-mortem room. The notochordal nodules were of such small size and soft consistence as not to give rise to pressure symptoms, still less to a fatal issue. From 1903 onwards, however, reported cases of chordoma have nearly all been of frankly neoplastic character and of clinical importance, the tumours being of large size and causing serious pressure effects.

From the clinical standpoint it seems desirable that a clear distinction should be drawn between these two conditions—the small jelly-like nodules with very limited powers of growth, and the large progressive formations which give rise to symptoms and in time cause death. The former are of the nature of notochordal protrusions rather than tumours; the latter are genuine neoplasms, possessing in most cases many of the



FIG. 1.—‘Eccordosis physaliphora sphenoccipitalis’: a protrusion and limited proliferation of notochordal tissue through the middle of the clivus. There is an aperture in the dura mater at this point.

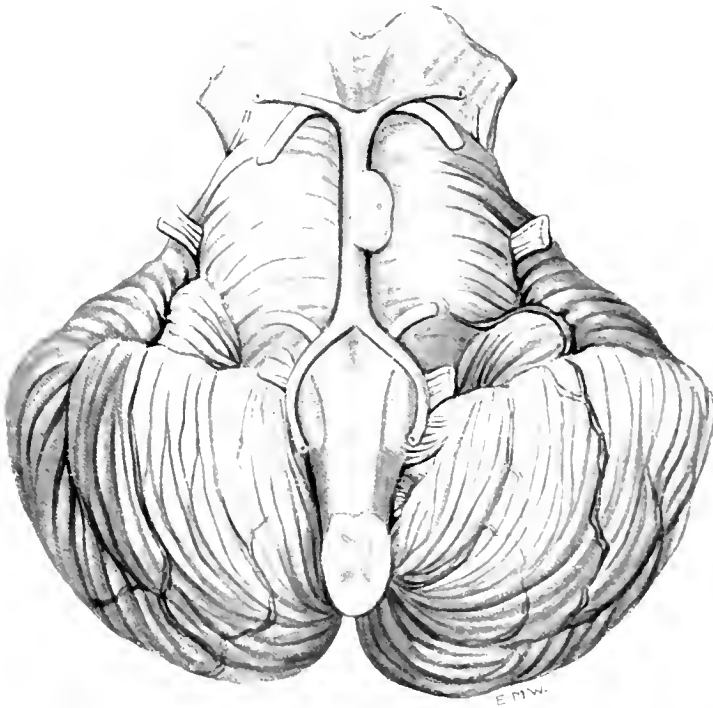


FIG. 2.—Pons, medulla and cerebellum from the same case as *Fig. 1*. Part of the notochordal protrusion is adherent to the basilar artery, and has been torn away from the rest in the removal of the brain.

stigmata of malignancy. We would suggest that the term 'chordoma' be reserved for the second group, and that a variant of Virchow's term, 'Eechordosis physaliphora,' might be applied to the others. It may be that there are intermediate grades, or that chordoma proper arises in and from a pre-existing ecchordosis, but the important practical point is that the clean-cut division suggested is entirely justified by all the cases of both types so far recorded.

Ribbert ⁶ (1904) has stated that ecchordosis spheno-occipitalis is a thing of common occurrence, and claimed to have found it himself in 2 per cent. of autopsies. So far as we are aware this high incidence rate has not been confirmed by others, and as the matter is of considerable theoretical importance we thought it worth while to try to obtain further evidence. In a series of 200 specially investigated autopsies, we have found three examples of spheno-occipital ecchordosis, all of them of small size, an incidence rate of 1.5 per cent. In each, the little gelatinous nodule arose from the middle line of the clivus, about half an inch behind the posterior margin of the pituitary fossa, and projected through an aperture in the dura mater. In each, also, there was adhesion to the basilar artery, so that in two cases the nodule was torn across in removing the brain from the skull (*Figs. 1 and 2*), while in the third it separated from the bone and adhered to the artery in its entirety.

The first (and largest) specimen (*Figs. 1 and 2*) was from a woman of fifty-nine, who died of advanced polycystic disease of the kidneys and liver; the second, which was much smaller, from a man of seventy-one, who died of pyæmia following suicidal cut-throat. He was suffering at the time from advanced silicosis and phthisis. The third (*Fig. 3*) was also very small in size, and was from a woman of sixty, who died of cancer of the pharynx. *Fig. 4* shows the tiny aperture in the dura mater

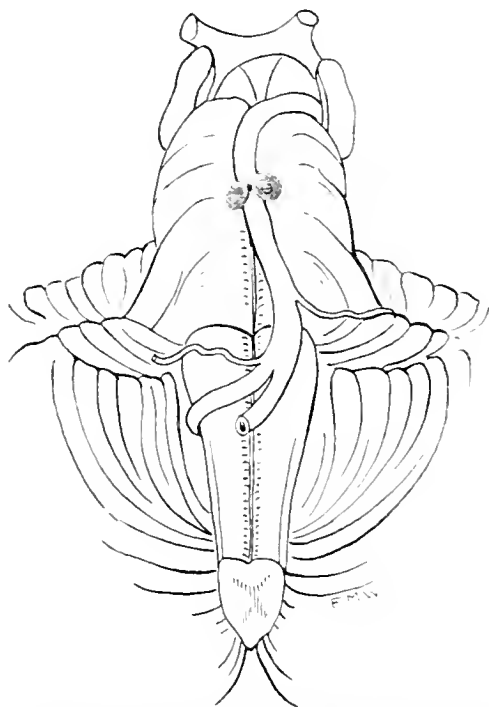


FIG. 3.—A small, bilobed ecchordosis physaliphora is seen adherent to the basilar artery

of the dorsum sellae present in this case. The echordosis, which consisted of two tiny jelly-like nodules adherent to the basilar artery, lay immediately over the aperture, through which it had presumably made its way from the subjacent bone.

In a fourth case, where no extra-osseous protrusion of notochordal tissue had occurred, a small projecting bony nodule in the middle line of the clivus was found to contain in its interior a little mass of similar clear, transparent jelly-like tissue.

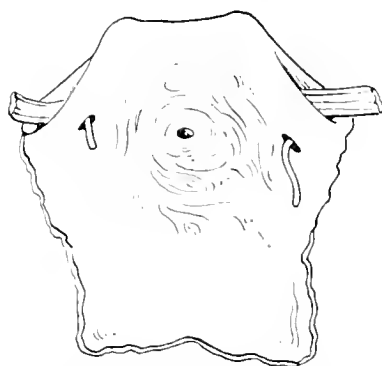


FIG. 4.—The clivus blumenbachii (dorsum sellae) of the same case, showing a tiny aperture in the dura mater exactly opposite the position of the echordosis.

Microscopically, all these nodules consist of a number of highly vacuolated, mucin-containing cells, showing little or no evidence of active growth, with, here and there, large intercellular collections of homogeneous secretion, only some of which gives the staining reactions of mucin. In sections stained with hæmatoxylin and eosin the appearance of the more cellular areas is not unlike that of

adipose tissue, and is almost exactly like the section of chick-embryo notochord figured in the last edition of Stöhr's *Histologie*.⁷

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SYPHILIS AS AN ETIOLOGICAL FACTOR IN MONGOLIAN IDIOCY.

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FROM time to time various theories have been advanced to explain the origin of Mongolian idiocy, but it cannot be said that the work of the last fifty years has much to justify a confident pronouncement on the etiology of this interesting and obscure disease. The condition seems to be essentially one in which hereditary influences play a subsidiary part, and consequently attention has been chiefly directed to the state of health of the parents and to a search for factors which might injuriously affect prenatal development. Down¹ himself considered tuberculosis in the parents an important etiological factor, but his conclusion has received little or no support from the observations of subsequent writers.

Stress has also been laid on the frequency of exhaustion of the reproductive functions in the mother, for the Mongol is often the last child of a mother nearing the menopause, but here again there are numerous exceptions which indicate that some other factor must be taken into account.

In appraising the value of any theory which is held to explain the origin of this disease, it is necessary to bear in mind that certain clinical conditions must be satisfied. First, although a history may be forthcoming of severe physical or mental shock to the mother during pregnancy, a Mongol may be born of a woman who was in apparent good health at the time of conception and during the whole period of pregnancy. Secondly, both parents may be at the zenith of their reproductive period of life, being neither unduly young nor unduly old. Thirdly, the Mongol may not only be the first and last born child, but may occupy an intermediate position in the family. Fourthly, pregnancies terminating in the birth of normal children may both precede and follow the birth of a Mongol, and lastly, the Mongol may be one of twins, the other being a perfectly healthy child. It follows, therefore, that general conditions such as uterine exhaustion, mental stress, and so on, cannot explain satisfactorily the origin of this disease, and, as Sutherland has pointed out, it is far more likely that such an exact type of disease owes its origin to one and the same cause in all cases. Although the physician is often assured that the health of the Mongol's mother was good throughout pregnancy, the possibility of some infection interfering with prenatal

development must always be entertained, and among those of an organismal nature syphilis, by reason of its prevalence and far-reaching results, demands first consideration. From this point of view it is instructive to recall certain of its peculiarities in relation to inheritance.

It is well known that the disease may be entirely latent, especially in pregnant women; there may be no rashes or other secondary manifestations, and a series of abortions may provide the first evidence of infection in the mother. It is also a familiar observation that there are numerous exceptions to the general rule which states that the degree of transmissibility of syphilis usually diminishes in proportion to the duration of the disease. While first pregnancies in infected women are usually likely to end in early abortions, followed in succession by late abortions, infected children and finally healthy offspring, it not infrequently happens that a syphilitic child is, as it were, slipped in between healthy children, much in the same way as the Mongol may occupy a place in the family between normal children.

Then again a syphilitic woman may give birth to twins one of whom presents stigmata of congenital syphilis, while the other enjoys immunity or shows no obvious symptoms.

It is clear that syphilis shows an extraordinary capriciousness in its transmissibility, and it seems to us no less clear that the explanation of Mongolism must be sought in some equally capricious factor. The question naturally arises, is it possible that the specific organism of syphilis is the cause of Mongolian idiocy? A review of the literature shows that there is no settled agreement on this question, and unfortunately few attempts appear to have been made to discover the frequency of syphilis in the parents of Mongolian children.

Sutherland ² appears to have been the first to suggest syphilis as an etiological factor, and out of his total of twenty-five cases there was evidence of syphilis in eleven instances, and in three others it was strongly suspected. In a series of twenty-six cases analysed by Muir ³ evidence of syphilis was obtained in three families. Comby, ⁴ in a review of seventy-nine cases, found evidence of syphilis in only ten patients. Goddard ⁵ states that of twenty-eight Mongols examined at the Columbus Institute, Ohio, 17.8 per cent. gave a positive Wassermann reaction.

On the other hand, Still ⁶ found evidence of syphilis in only one case in his series, and at the Killner Institute in Denmark the Wassermann reaction was negative in all cases. Van der Bogert ⁷ has recorded an extremely instructive example of the association of the two diseases in one family. Of four children the eldest was a typical Mongol with a positive Wassermann reaction in the blood. There had been no mis-carriages and no history of syphilis could be obtained from the parents, but four years after the birth of the Mongol twins were born, one of whom (when examined at the age of five years) was a normal child with

a negative Wassermann reaction. The other was a congenital syphilitic bearing so close a resemblance to a Mongol that, when shown at a clinical meeting, he was accepted by all present as an example of this disease.

Babonneix and Blum ⁸ have also reported two cases combining the features of Mongolism and congenital syphilis, and in an earlier contribution to the anatomical study of Mongolian idiocy Babonneix ⁹ described the presence of a meningeal gumma in the sulcus separating the right prefrontal and postfrontal gyri. Another significant fact brought out by a review of the literature pertaining to Mongolism is the frequency with which the birth of a Mongol is foreshadowed by one or more miscarriages, and one of the most striking examples we have encountered relates to the history of an imbecile who is at present an inmate of the Leavesden Mental Hospital. The father, a commercial traveller, died of heart disease at the age of forty-two; he was described as a steady and industrious man, but never enjoyed good health. The mother stated that her health had always been excellent. During the first few years of married life she had six miscarriages—'small affairs'—followed by the birth of a succession of premature children. One was born dead at six and a half months; a second at seven months; a third, at seven and a half months, lived for one hour; a fourth, at eight months, lived three days; a fifth, at seven months, lived several hours. The sixth child survived, and is now nineteen years old, delicate, with a 'tendency to consumption.' The seventh child, a breech presentation case, showed the features of Mongolism, while the eighth and last child died at birth. At the time of birth of the Mongol the mother was in her fortieth year. A rough examination of her nervous system showed irregular eccentric pupils, reacting sluggishly to light, and absent knee jerks. Her blood Wassermann reaction was strongly positive; that of the Mongol was negative. Maternal histories as striking as the above are doubtless rare, but we have been able to discover numerous instances where a history of one or more miscarriages is mentioned. None the less, there are a large number of competent observers who state that syphilis cannot possibly be admitted as an etiological factor. Tredgold, ¹⁰ for example, was unable to discover any predominance of syphilis in over twenty cases investigated by him, while Goddard ⁵ states that he could find no conclusive proof that syphilis in the parent causes Mongolism, or indeed, feeble-mindedness of any type. He also considers that the lack of correlation between the incidence of Mongolism and this disease constitutes a fatal objection to the syphilitic theory. Mongolian imbecility is, relatively speaking, very rare; syphilis is far from rare; why, therefore, is this peculiar form of mental defect not vastly more prevalent than it is? The validity of an argument of this character seems to us to be decidedly open to question. It is well known that

certain congenital diseases, rarer even than Mongolism, may have a syphilitic origin, and if, for example, syphilis may produce infantilism, it is surely not illogical to suppose that under certain conditions, not as yet elucidated, it may also play a part in the genesis of Mongolian idiocy. It is a fact of common observation that conclusions regarding the incidence of syphilis based solely on historical data and clinical evidence are apt to be very wide of the mark, and to vary according to the preconceived idea of the investigator, and probably for this reason attempts have lately been made to settle the relationship of syphilis to Mongolism by the application of the Wassermann reaction. The number of cases examined, however, does not appear to be large, and we have been able to find only two papers dealing with the results in a reasonably adequate series of cases.

Stevens¹¹ applied the Wassermann reaction to the blood serum of thirty-eight Mongols and obtained positive results in 21 per cent., and in a second series¹² of eighteen, the test was positive in the blood in 33 per cent., and in the cerebrospinal fluid in 18.4 per cent. A novel feature of this investigation was the discovery that 97.4 per cent. of the spinal fluids gave a syphilitic curve with the colloidal gold reaction, and Stevens concludes that Mongolism is a result of syphilitic infection which probably 'acts primarily on some of the endocrine organs, possibly the pituitary.'

These results seem to go a long way towards establishing a syphilitic basis for the disease, but unfortunately the methods adopted by Stevens in interpreting the tests are open to criticism. The entire absence of pleocytosis noted by him is hard to reconcile with an increased globulin content in every case, and since no details are given of the technique employed in preparing the gold-sol it is possible that the syphilitic curves obtained were due to the use of an acid solution of colloidal gold. Furthermore, the degrees of precipitation noted by Stevens were in some cases extremely slight, no greater, indeed, than those which are occasionally found when normal spinal fluids are tested.

At a later date McClelland and Ruh¹³ repeated the tests on a different series of patients, thirteen in number, and obtained almost completely negative results. The Wassermann reaction was negative in all cases in both blood and cerebrospinal fluid; only two cases showed an increase of globulin by the Pandy test, and in every instance the colloidal gold reaction was negative. In view of the conflicting nature of these reports we have thought it desirable to examine a much larger series, and with the help of our colleagues at Caterham we have been able to apply these tests to fifty-five Mongols. The Wassermann reactions were carried out for the most part at Caterham Mental Hospital, and a few at Bethlem Royal Hospital, and we would like to place on record our thanks to Dr. Gordon and Dr. Lovell for their generous assistance. The spinal fluids

Case No.	Blood.		Cerebrospinal Fluid											
	Wassermann Reaction.	Wassermann Reaction.	Cells per c mm.	Globulin.	Colloidal Gold Test.									
					1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1	—	—	1	—	1	1	2	2	1	0	0	0	0	0
2	—	—	1.3	—	1	1	2	2	2	1	1	0	0	0
3	—	—	1	—	1	1	2	2	2	1	1	0	0	0
4	—	—	0.6	—	1	1	2	2	2	1	1	0	0	0
5	—	—	1	—	1	1	2	2	2	1	0	0	0	0
6	—	—	3	—	1	1	2	2	2	1	0	0	0	0
7	—	—	1	—	1	1	2	2	2	1	0	0	0	0
8	—	—	1	—	1	1	2	2	2	1	0	0	0	0
9	—	—	2.3	—	1	1	2	2	1	0	0	0	0	0
10	—	—	2	—	1	1	2	2	1	0	0	0	0	0
11	—	—	2	—	1	2	3	1	1	0	0	0	0	0
12	—	—	2	—	1	1	2	2	2	1	0	0	0	0
13	—	—	1.3	—	1	2	3	3	2	1	0	0	0	0
14	—	—	4.6	—	1	2	3	3	3	1	0	0	0	0
15	—	—	2	—	1	2	3	1	0	0	0	0	0	0
16	—	—	1	—	1	2	3	2	1	0	0	0	0	0
17	—	—	1	—	1	2	3	3	1	0	0	0	0	0
18	—	—	1	—	1	2	3	1	1	0	0	0	0	0
19	—	—	1	—	1	1	3	2	2	1	0	0	0	0
20	—	—	1.6	—	1	2	3	3	1	0	0	0	0	0
21	—	—	0.6	—	1	2	3	3	2	1	0	0	0	0
22	—	—	1.3	—	1	1	2	3	3	2	0	0	0	0
23	—	—	1	—	1	1	2	2	1	0	0	0	0	0
24	—	—	0.6	—	1	1	2	2	2	1	0	0	0	0
25	—	—	0.6	—	1	1	2	2	2	1	0	0	0	0
26	—	—	0.3	—	1	1	2	2	2	0	0	0	0	0
27	—	—	1	—	1	1	2	2	1	0	0	0	0	0
28	—	—	0.6	—	1	2	2	1	1	0	0	0	0	0
29	—	—	0.3	—	1	1	2	2	1	0	0	0	0	0
30	—	—	0.3	—	1	2	2	1	1	0	0	0	0	0
31	—	—	2	—	1	2	2	1	1	0	0	0	0	0
32	—	—	3	—	1	1	2	2	1	0	0	0	0	0
33	—	—	1	—	1	2	2	1	1	0	0	0	0	0
34	—	—	0.3	—	1	1	2	2	1	0	0	0	0	0
35	—	—	1	—	1	2	2	1	1	0	0	0	0	0
36	—	—	0.6	—	1	1	2	2	1	0	0	0	0	0
37	—	—	0.6	—	1	2	3	3	2	1	0	0	0	0
38	—	—	1	—	1	1	2	2	1	0	0	0	0	0
39	—	—	0.3	—	1	1	2	1	1	0	0	0	0	0
40	—	—	2	—	1	1	2	2	1	0	0	0	0	0
41	—	—	0.3	—	1	1	2	2	2	0	0	0	0	0
42	—	—	1.3	—	1	1	2	2	2	1	0	0	0	0
43	—	—	0.3	—	1	2	3	2	1	0	0	0	0	0
44	—	—	1.6	—	1	1	2	2	1	0	0	0	0	0
45	—	—	1	—	1	1	2	2	1	0	0	0	0	0
46	—	—	0.3	—	1	2	2	1	1	0	0	0	0	0
47	—	—	3	—	1	2	2	1	1	0	0	0	0	0
48	—	—	0.3	—	1	1	2	1	1	0	0	0	0	0
49	—	—	2	—	1	2	2	1	0	0	0	0	0	0
50	—	—	0.3	—	1	2	2	1	1	0	0	0	0	0
51	—	—	1	—	1	2	2	1	1	0	0	0	0	0
52	—	—	2	—	1	2	2	2	1	0	0	0	0	0
53	—	—	1.3	—	1	1	2	1	1	0	0	0	0	0
54	—	—	0.3	—	1	1	2	2	2	1	0	0	0	0
55	—	—	3	—	1	1	2	2	1	1	0	0	0	0

were also examined for cell count and globulin content, and response to the colloidal gold reaction. In performing the latter we were careful to

use only neutral unprotected sols, prepared by the method of Miller, Brush, Hammers and Felton.¹⁴ Normal, syphilitic, and parietic fluids were used throughout as controls.

It will be seen from the accompanying table that the Wassermann reaction was positive only once in the blood, and uniformly negative in the spinal fluid. On the other hand, with the colloidal gold test, the precipitation curve characteristic of syphilis was found in nearly every fluid examined. The cell count and globulin content were within the limits of the normal in all cases.

The interpretation of these results is a matter of some difficulty, and at first glance it might be thought that the occurrence of only one positive Wassermann reaction in fifty-five samples of blood disposes of the syphilitic theory in a conclusive manner, but for several reasons it seems wiser to avoid such a conclusion. In the first place, the Wassermann reaction has the limitations which are attached to every laboratory test, and it by no means follows that a negative reaction excludes the possibility of infection. It would, of course, be absurd to disregard the significance of so many negative results, but the need for caution will be recognized when it is pointed out how often negative serological findings are encountered in congenital syphilis. In our experience the Wassermann reaction is far less reliable in congenital syphilis than in any of the acquired forms of the disease, for we have seen a large number of young adults presenting the Hutchinsonian facies whose blood and cerebrospinal fluid gave negative reactions, and such appears to be the experience of other workers. Wile and Marshall,¹⁵ for example, obtained a positive Wassermann reaction in only 16.9 per cent. of a series of fifty-three cases of congenital syphilis.

With regard to the precipitation curves obtained with the colloidal gold reaction it will be seen that while decoloration never proceeded very far, it was a constant phenomenon, and corresponded to the type of curve described by Eskuehen¹⁶ under the term 'lues latens.' It may be, as some writers have suggested, that this reaction is a more sensitive test for latent or inactive syphilis than the Wassermann test, but on the other hand it must be borne in mind that it is not specific, for the so-called luetic and parietic curves may be found in the spinal fluids of individuals suffering from non-syphilitic disease, such as disseminated sclerosis, lethargic encephalitis, diphtheria, and poliomyelitis, and it is possible that Mongolian idiocy must be added to the list. Furthermore, until the rationale of the test is more completely understood, arguments based on its behaviour are clearly inadmissible.

Thus far, our investigations have failed to substantiate the contention of Stevens that Mongolian idiocy is a form of congenital syphilis, but they do seem to confirm his conclusion that the cerebrospinal fluid of the Mongol has the property of precipitating solutions of colloidal

gold in the syphilitic zone. It may be that future investigation will show that under certain conditions a syphilitic infection of the mother may determine biochemical changes in the developing embryo which are ultimately expressed in the physical peculiarities of Mongolism, and we consider that at this juncture it would be unwise to conclude that syphilis plays no part in the origin of this disease. The subject is one calling for further elucidation, and it seems to us that investigation of the parents from this standpoint offers a fruitful line of inquiry.

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INTRACRANIAL PRESSURE CHANGES DURING EXPERIMENTAL CONVULSIONS.

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THE conspicuous symptom of epilepsy—the convulsion—has been studied from many angles, but little work has been done on the hydrodynamics of the spinal fluid during convulsions. This paper mentions a few clinical observations on the cerebrospinal fluid pressure during convulsions, and reports a short series of experiments on animals in which various pressure measurements were made during experimental convulsions. A series of fourteen animals were used for the intracranial pressure experiments, eight young dogs and six cats; and several rabbits were trephined for the direct observation of the cortex during a convulsion.

Thujone, the convulsive agent used, is the active principle of absinthe and is pharmacologically classified in the camphor group. The extract used in these experiments was kindly prepared by Professor Grinnell Jones, of the Department of Chemistry of Harvard University, who distilled this preparation from oil of tansy. The exact point of its action is not definitely known, although Hildebrant,¹ working on the camphor group of drugs in 1902, concluded that thujone acted on the medulla primarily and the vasomotor centre specifically. This is doubtful, because former experiments in this laboratory¹⁸ have shown that a much larger dose is needed to cause a convulsion in a decorticate or decerebrate animal than is needed to cause a similar convulsion in an intact animal, in which the cortex is active. In other words, we believe that the cortical motor cells are the ones which can be most easily stimulated by these convulsants.

It is sufficient for our purpose to say that the march of events during a convulsion produced by thujone is very similar to that seen during an epileptic fit. Within a few seconds after the drug is given intravenously the animal moves in a restless, uneasy manner and almost invariably raises its head and sniffs about the cage. Then one observes rapid constriction of the pupils and of the vessels of the ear. Immediately after

* From the Neuropathological Laboratory of the Harvard Medical School. This work was made possible by a generous grant from the Committee on Epilepsy, Charles P. Howland, Secretary, 61, Broadway, N.Y.

this there is retraction of the head, tetanic extensor spasms of the fore limbs and more rarely of the hind limbs. Then comes the stage of clonic convulsion, during which the animal dashes and jerks about the cage. The actual convulsion is accompanied by dilatation of the pupils, exophthalmos, and marked congestion of the ear veins: it is followed by a relaxed period with loss of sphincter control.

Our problem may be stated in two questions:—

1. What changes, if any, occur in the cerebrospinal fluid pressure during convulsions?
2. What are the relationships of these changes to blood pressure?

There is still some discussion as to the exact relations between the intracranial venous, arterial and cerebrospinal fluid pressure. The generally accepted view at the present time appears to be that all sudden changes of intracranial pressure are parallel with venous pressure changes within the skull, which passively follow changes in the systemic circulation. Slow changes, such as those due to oedema, may not vary directly with intracranial venous pressure. This whole subject has been admirably reviewed by Weed.²

The question of vasomotor control of the cerebral vessels has not been settled, nor has the possible influence of secretory activities been entirely ruled out. Physiological interpretation, therefore, will probably fare better at a later date.

METHODS.

In all cases 20 per cent. thujone in Norwegian cod-liver oil was given intravenously. The dosage for each animal was determined experimentally, as a variation in sensitivity to the drug has been found. In the average animal from .002 c.c. to .005 c.c. per kilogram of body weight produced a comparatively severe convulsion. Several times this dose is required to produce a similar convulsion in an animal under ether. In all operations ether was given by tracheal canula to insure a constant state of anaesthesia.

The animal was anaesthetized and the tracheal canula introduced. It was then placed in a ventral position and its legs extended and tied, while its head was held level by means of a jaw clamp. The jugular vein was exposed and connected to a manometer of 1 mm. bore, partially filled with 4 per cent. sodium citrate solution. The saphenous vein was exposed for thujone injections and the femoral artery connected with a mercury manometer.

The skull was then exposed and a dentist's drill was used to make an opening about 2 mm. in diameter. A lumbar puncture needle connected to a manometer of 1 mm. bore, filled to a height of 110 mm. with Ringer's solution, was introduced into the lateral ventricle. Readings were taken at regular intervals from the venous and cerebrospinal fluid

manometers. The arterial pressure was recorded on a kymograph. After a control period thujone was introduced into the exposed vein, and the effect of the convulsion was observed. In four animals this procedure was modified by substituting a cisternal puncture for the ventricular puncture. In two animals the intracranial venous pressure was taken by a needle in the longitudinal sinus as described by Weed.²

The variation in cerebrospinal fluid pressure caused by gravity, as shown by Hill,³ has to be considered. In our experiments the animals were placed in a prone position and their heads were kept level. The intracranial pressures were considered as phenomena coming under the physical laws of the 'closed box,' the Monroe-Kellie doctrine. This has been restated by Weed and Hughson⁴ recently, and is now generally accepted. In performing ventricular punctures, therefore, an opening only large enough to admit the needle was made, and the needle was then sealed in place with wax. Care was taken to avoid loss of fluid, and to avoid the introduction of any considerable amount of fluid into the subarachnoid space through the manometer system.

EXPERIMENTAL OBSERVATIONS.

By these methods some twenty experiments were performed. Those that consisted of mere observation of the brain are described below. The manometer experiments are best explained by the accompanying charts, which show typical results.

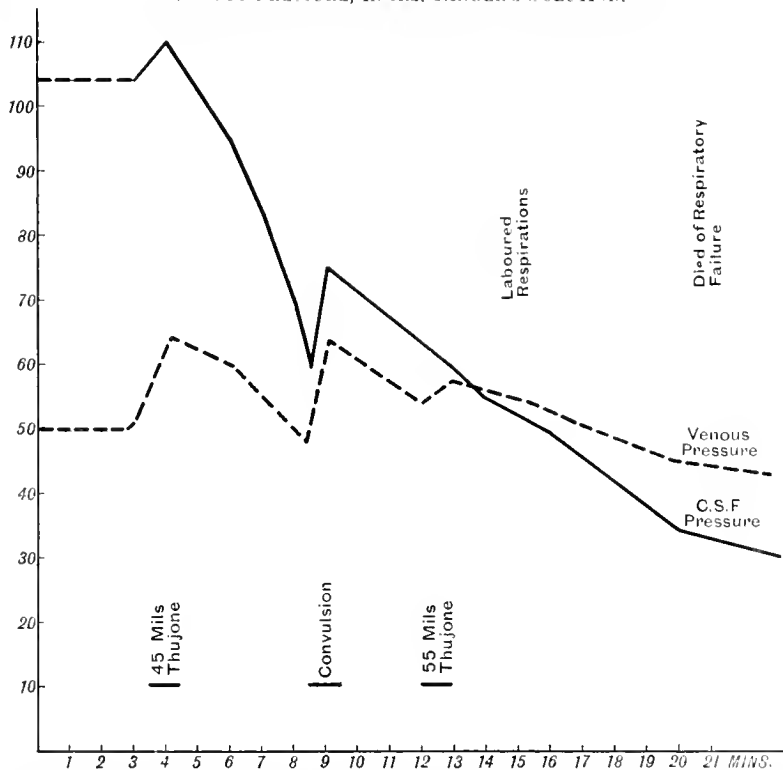
A kymograph record of intracranial pressure was made by attaching a membrane tambour to a funnel-shaped glass sealed over a trephine hole. This record shows a distinct fall before the convulsion and a marked rise during the convulsion, indicating that the intracranial contents first shrink and then swell. Venous pressure records taken simultaneously show marked oscillations during the muscular spasms.

Direct observations of the brain were made in a number of animals, by exposing the cortex through a trephine hole. Thujone was given as in the other experiments. Just before a convulsion the brain appears to shrink and blanch. It retracts very definitely, leaving a space under the calvarium. That this stage is coincident with the fall in cerebrospinal fluid pressure was shown several times by observing the brain while a manometer was connected with the lateral ventricle. After the momentary blanching and shrinking, the brain surface becomes congested, seems to swell and pushes through the trephine opening. At this moment the fluid in the ventricular manometer rises to a high point.

It is interesting to note that the same sequence of events occurs in animals with lowered intracranial pressure following hypertonic salt solution.² Observations were made on three such cases, and in each the

CHART I.

CAT, N-23-50. VENTRICULAR PUNCTURE FOR C.S.F. PRESSURE, JUGULAR VEIN FOR VENOUS PRESSURE, IN MM. RINGER'S SOLUTION.



In this experiment the intracranial pressure is measured by ventricular puncture, the needle being connected with a manometer full of Ringer's solution. The venous pressure is simultaneously measured by a manometer connected with the jugular vein. The readings are in millimetres of Ringer's solution. It is seen that the intracranial pressure was 105 mm. of Ringer's solution during the control period. During the injection of 0.45 c.c. of a 20 per cent. solution thujone, a slight rise occurred; then there was an immediate fall to 60 mm., and, with the onset of the convulsion, a rise. The venous pressure is seen to keep quite parallel with the intracranial. In this case a second dose of thujone proved fatal.

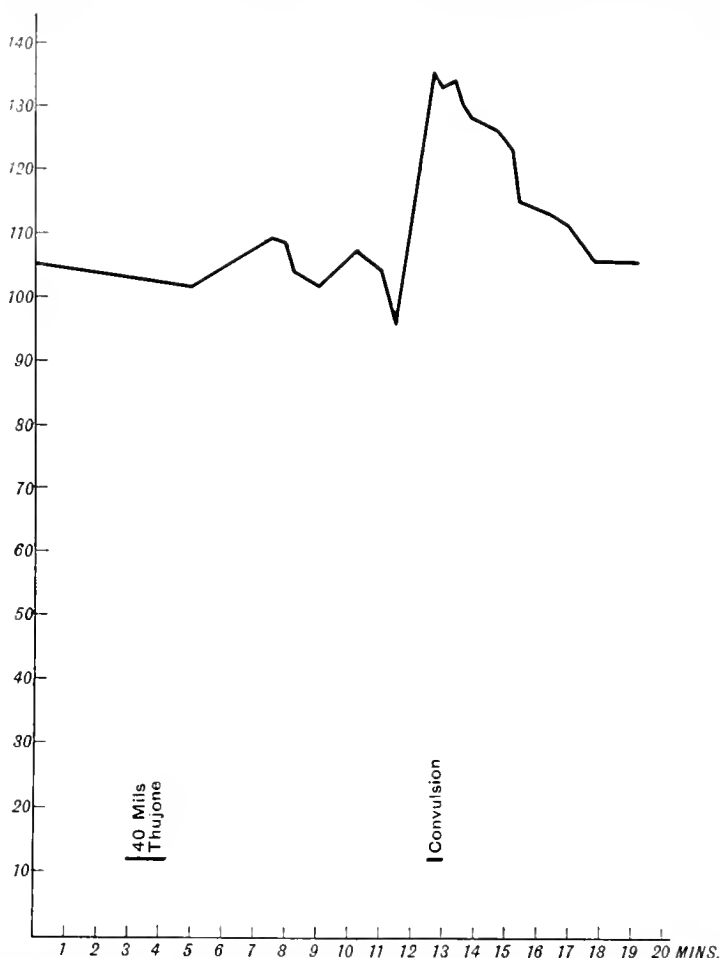
subsequent rise was greater than that usually seen in the animals whose brains had not been previously shrunken with this hypertonic solution.

CLINICAL CONSIDERATIONS.

Three interesting clinical observations have been made recently during lumbar puncture on epileptics. In one case the operator had his needle in the lumbar subarachnoid space and was reading the pressure as registered by his manometer. Suddenly a marked fall in pressure occurred, so that he thought there must be a leak in the connections; then there was a rapid rise of the fluid to the top of the manometer, over

CHART 2.

CAT, N-23-47. C.S.F. PRESSURE VIA CISTERN, IN MM. RINGER'S SOLUTION.



This experiment simply consists of recording the pressure of the cerebrospinal fluid by cistern puncture and a manometer filled with Ringer's solution. Immediately after the injection of thujone the preliminary fall in pressure is noted, but it is not as marked as is usually observed. The two small rises after the first drop correspond with slight twitching movements. Then there is a rather sudden drop before the onset of the severe convulsion. With the convulsion there is a conspicuous rise of pressure.

400 mm. It was then observed that the patient was having an attack, and the needle was removed.

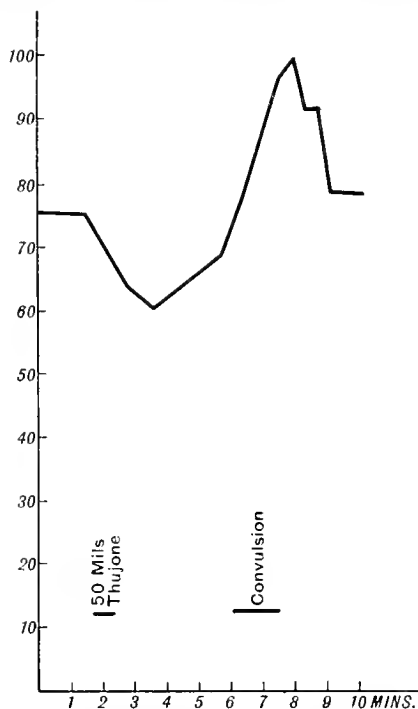
In another case lumbar puncture was performed on a patient during status epilepticus; the fits were coming one after another at intervals of two to five minutes, and the patient was never really relaxed between them. The pressure was found to be high all the time, and during a hard

convulsive period flowed out at the top of the manometer tube, that is, registered well above 400 mm.

The third case was that of a paretic, who was being lumbar-punctured for treatment. Readings of the fluid pressure were being made, when suddenly a marked drop in pressure occurred. The needle

CHART 3.

Doc. N-23-51 ARTERIAL PRESSURE, IN MM. MERCURY.



The curve is plotted from a kymograph record, to correspond with Charts 1 and 2, but the measurement is in millimetres of mercury. This curve is a typical one of the changes in arterial pressure during a convulsion. Following the thujone injection there is a drop and then a gradual rise before the onset of the convulsion. A sharp rise occurs as the muscular spasm of the fit supervenes.

was quickly removed, and a few seconds later the patient had a convulsion. Immediately after the convulsion the spinal fluid pressure was measured by another puncture, and was found to be back at its normal level. We wish to thank Drs. Mella, Mixter, and Solomon for allowing us to use their observations in these cases.

Leriche⁶ mentions that Virsin had seen the cerebrospinal fluid pressure double at the time of an epileptic crisis. Pollock⁷ has tracings

of the blood pressure during a *petit mal* attack which show a preliminary rise, and then a sudden marked drop before an attack. The blood pressure remained low during the attack.

Quite a number of direct observations of the human cortex during an epileptic convulsion have been made by surgeons. Kennedy and Hartwell,⁸ watching the brain of a patient during a fit, noted, as the initial sign, a sudden whitening of the cortex, which was immediately replaced by a tremendous venous engorgement with protrusion of the brain beyond the level of the operative bone defect. Leriche⁶ noted in an operative case that the onset of a convulsion was preceded by the arrest of cerebral pulsation and blanching of the pial vessels. Horrax¹⁶ has frequently observed great bulging of the brain during convulsions. This experience of his was largely in military hospitals, while he was repairing hernias of the brain under local anaesthesia. He states that during the period of apnoea and rigidity the brain became congested and protruded through the skull defect, sometimes to such an extent that it was necessary for him to cover the wound with moist cotton and exert pressure with his hand in order to avoid destructive herniation. He remarks that similar, though less extensive, congestion and bulging may be observed by asking the conscious patient to cough, or strain or "bear down." Obviously these phenomena are the result of increased intrathoracic pressure. Thom⁹ has shown that dilated ventricles are a common post-mortem finding in epilepsy. Our own autopsy experience has corroborated this.

It occurred to us that dilatation of the cerebral ventricles might result mechanically from repeated convulsions and consequent high intraventricular pressure. Furthermore it is a frequent observation that sclerosis of the cornu ammonis is present in epilepsy. Steiner¹⁰ states that as many as 40 per cent. of epileptics show this lesion. Alzheimer¹¹ says a little over one-half of cases of idiopathic epilepsy show it, about 60 per cent. of all cases of epilepsy being 'idiopathic.' Spielmyer,¹² Kogerer,¹³ Wigglesworth and Watson,¹⁴ all note this sclerosis. Lynn-Thomas¹⁵ mentions a case of neoplasm with convulsions, dilated ventricles, and sclerosis of the cornu ammonis. Taft¹⁹ mentions changes of the same part in general paresis with convulsions. Such evidence leads one to speculate further. May it not be possible that the sclerosis of the cornu ammonis is a result of the dilatation of the ventricles—the end result of increased intraventricular pressure?

With this point in view we studied several series of young rabbits, giving them frequent severe convulsions with thujone in an attempt to produce dilated ventricles and sclerosis of the cornu. Sixteen rabbits were used, but our results were negative. All the rabbits died young, four months being the longest period of survival. Most of them died of transverse myelitis, acquired during a fit. It is possible that less severe

convulsions, continued over a longer period, might produce ventricular and hippocampal changes.

It may be that Dandy¹⁷ has the correct explanation of ventricular dilatation when he considers it a space-compensating function, the fluid replacing brain tissue in atrophic processes. The finding, however, of symmetrically dilated ventricles, with no obvious cerebral atrophy, would be hard to explain on this basis.

SUMMARY.

In a series of experiments it has been observed that during thujone convulsions there is an initial fall in the cerebrospinal fluid pressure just preceding the onset of the attack, and a rise in pressure during the fit. Coincident with the fall in pressure there is blanching and retraction of the cortex, followed by marked congestion and bulging. The cerebrospinal fluid pressure follows in general the curves of the peripheral venous and arterial pressures. There is some clinical evidence that similar changes take place during human epileptic convulsions.

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THE AFTER-HISTORY OF SOME CASES OF EPIDEMIC ENCEPHALITIS, WITH ESPECIAL REFERENCE TO CHANGES IN CONDUCT.

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DURING the past two or three years attention has been drawn to the behaviour of a number of children in the elementary schools who have shown peculiar disturbances of conduct after absence from febrile illnesses which were very vaguely described by the parents, the chief feature being alleged long periods of unconsciousness or somnolence. On inquiry some of these cases proved to be those of children who had suffered from encephalitis lethargica; the names of these were recorded on a card index, reports being obtained at intervals so long as they remained at school. There has naturally been considerable wastage, but up to the present more or less continuous records of forty-four children have been obtained. In some of the cases the condition had been notified at the time of the original illness, in others the diagnosis had been made either at hospital or at a school medical examination some time later. The symptoms to which attention was drawn from the school were either unusual sleepiness, marked irritability or misbehaviour, or a falling off in educational ability.

In the majority of cases the initial illness was characterized by fever and some degree of lethargy; in about one-third of the cases there were definite physical symptoms such as partial paralysis, choreiform movements, tremors of the hand, or ties; and in a somewhat larger proportion there had been at one time a squint or diplopia. So far as a general description can be given, the children, at any rate on the occasion of the first school examinations, showed a combination of apathy with momentary irritability, a heightened sensibility to all environmental stresses, and a greater degree of suggestibility. There was a rapid onset of mental fatigue and inattention, so that a marked failure was observed in all tests requiring planning and concentration or exercise of self-criticism. In a certain number of the children neurotic symptoms were superadded to a genuine, though usually slight, physical disability.

The only feature of note in the mildest instances was the diminished power or will for attention in school, with a consequent falling off in school work. It was noticed that the attention returned earliest for

interesting lessons. In others there was also a certain amount of falling asleep in school, but in these it was often found that the child was restless and had difficulty in getting to sleep at night, so that part of the sleepiness in school may have been of a physiological nature. In the course of time this has passed off, the child first keeping awake for interesting lessons and going to sleep for the longest time during such lessons as arithmetic. The intellectual condition as estimated by school work and tests has largely recovered, in the majority of cases, though the rate and extent of the recovery seems to have varied with the age at the time of the initial illness, the youngest cases being the slowest to recover. In some the mental state, educationally at any rate, amounts to 'mental deficiency,' though it is scarcely possible even yet to express a certain opinion as to the permanence of the condition.

A somewhat more severe condition is illustrated by the case of a little girl of ten, concerning whom the head mistress wrote that she had a peculiar temperament and tendencies. She had been very ill with 'sleepy sickness,' and when she returned to school she used to fall asleep every morning and afternoon. Three years later she was reported as having been for some months a source of difficulty to all her teachers, seemed to have no moral sense, took school material and even money, could not speak the truth, was spiteful to others, and wished to go her own way in all respects. When spoken to she simply went to sleep, and on one occasion when sent to the head mistress to be reprimanded was found by her asleep outside her door. This description by an experienced mistress fits many cases and indicates the most salient features of their behaviour, namely, an egocentricity as marked as that of a very young child, coupled with a far greater power of taking refuge from unpleasant environments by a withdrawal of consciousness. Most of these, so long as they are not crossed, are described as lovable children, but with no power of self-control. They seem to have lost all power of weighing up a situation, and react at once by violence or screams. They express great contrition for their actions, but repeat the behaviour very shortly after. At this stage it is clear that remonstrances and punishment have no effect, yet after a time they are more appreciative of punishment and are less ready to misbehave when an instant retribution is probable. The difficulty is that this phase is often overlooked, especially by the parents, so that the children discover that by screams or struggles they can gain their desired ends. Once this discovery is made the convalescent child, like the normal infant, takes full advantage of his opportunities.

A good example of this was shown by a boy of twelve, who after encephalitis displayed behaviour disturbance, misconducting himself violently so that he could not be kept at school, although his responses to intelligence tests were above the average for his age, and his work,

when he chose, could be very good. He preyed on the neighbourhood, being let off several times on account of ill-health, but was at last charged and sent to an industrial school. Once there he resumed his tactics with a brief success, but on being told by the superintendent, on medical advice, that he was not immune from corporal punishment, he behaved well until sent on a fruit-picking expedition which he disliked, when he threatened to commit suicide. By this he achieved his immediate end in being sent back to the school, but lost various privileges, and finally realized that the threats were to his own detriment. He improved sufficiently to enter the army as a band boy, where he did well for over a year, but, on again meeting some petty difficulties, he took to pilfering and was discharged. The effect of the discharge, which he evidently did not intend to secure, again steadied him, and he has been satisfactorily reported upon for the last few months. He expresses himself as unable to stand small worries, and admits he then loses all control at once, or that he does not attempt very seriously to control himself. This inability to withstand petty worries has been pointed out by sufferers of a better social class, who say they can no longer overlook matters that they formerly took as a matter of course. The type of reaction in many ways resembles the peevishness shown by many normal persons who are convalescent from some slight febrile illness, or even while they are suffering from a common cold, and probably indicates individual temperamental traits showing up when the acquired habits of inhibition are removed.

Another type is shown by a boy who suffered from an attack of encephalitis of an abortive character. Previous to this he had behaved well at school, and had gained a prize, but after his illness he proved intractable. His physical condition showed a slight degree of right-sided paralysis which really interfered very little with his efficiency, but, being laughed at by his relatives, and probably by his school companions, for clumsiness, he first became very moody and irritable, and then developed a marked right hemiplegia which for the time completely incapacitated him—an example of a ‘functional’ addition to a previously existing organic lesion. Ordinarily the affected limb appeared completely spastic, but at times, when particularly interested, he made some use of it, in which case there was a marked intention-tremor. His determination that the limb was useless was unaffected by the discovery that he sometimes used it. At the age of ten, after his illness, he showed a mental age of ten on the Binet-Simon tests, and one of rather better than eleven on Healy tests, so that there was little or no intellectual impairment; he could do school tasks at the time of examination, but was unwilling to work more than brief periods. His conduct showed a steady increase in unreasonableness and violence, and there was an obvious conflict with his family. Sent away to fresh

surroundings in the country, he improved steadily, and is now well reported on, but it is doubtful if he can be left with any one who does not understand his peculiarities.

Another improving case is that of a boy, aged sixteen, who suffered from encephalitis at the age of twelve. There was a history of marked fidgetiness, diplopia and, for a time, choreiform movements, restlessness at night and sleepiness in the daytime, together with a marked deterioration in attainments. On examination it was evident that his attention readily flagged: his mental age on Binet tests was eleven, and on Porteus maze tests fourteen, while his educational responses were only equal to Standard IV., which was much below his previous level. While under observation he proved a difficult lad to handle, and there was some evidence of conflict with his family, but his conduct was never of a seriously reprehensible character. Boarded out in the country, he improved steadily; reports at intervals of a year have all been satisfactory, and he is now undertaking light employment. This fortunate result is probably due to the fact that he was removed from his surroundings before too deep a state of rebellion had been aroused.

Similar treatment was tried on a lad of eleven who, after an attack of encephalitis, had shown violent conduct, being spiteful to others and inclined to hit out with any object that came to hand. Intellectually he was up to his age, but quite uncontrolled. After a change he improved somewhat, but directly on his return to home and school he showed further signs of violent temper, hitting other boys with sticks, kicking a baby a year old, and resenting all interference. Some attempt had been made to investigate his mental processes, but his attention had never been fixed sufficiently, so that it appears to have been abandoned. At present, some three to four years after the onset, he requires the control of a young child and cannot be trusted alone, but there is no evidence of retardation in his responses to tests, which advance *pari passu* with his age.

The youngest child observed had suffered in the second year of life from encephalitis, during which he had lain lethargic for three weeks and had become dirty and vicious, with a frequent exhibition of coprophagia, although previously he had been a bright baby. When seen at the age of four and a half his mental age score was 2.75, and there was a history of improved behaviour; at the age of five and a half the score was about 3.5. It would seem, therefore, that the arrest of development was only partial, but as the gain in the last year was only about half that of the normal child, there is reason to fear the impairment of intellect may be such as to necessitate a special school education.

An example in which the impairment chiefly affected educational aptitudes is that of a girl attacked by encephalitis at the age of eleven in 1920. She had lethargy, diplopia and some facial paralysis. When

seen in June, 1921, her score on tests was about a year behind ; she could do reading and calculation, though not so well as previously ; she found composition and poetry very difficult, but could keep up to the standard in history and geography. The teacher reported that whereas formerly she had been a very bright child, she was now very dull. There was no restlessness or difficulty in sleeping at night. In November, 1921, she was found to have made normal intellectual progress, but was further behind scholastically ; she had occasional periods of lethargy in the daytime, with attacks of irritability and lack of interest. In February, 1923, she was reported as not nearly so irritable and to be making moderate progress in school, particularly in manual occupations. Later in the year it was said that her conduct had much improved ; her progress was fair, so that she did the ordinary work for her age ; she was brighter and exhibited more interest, but her concentration was erratic. She seems to be making a good recovery.

On the whole, the majority of the school cases have made favourable progress, the order being, first, an improvement in the general physical condition, the squint and diplopia disappearing within one to two years from the onset ; secondly, a recovery of power of attention spread over a longer period ; and lastly, and much more slowly, an improvement in the power of inhibition and a diminution of irritability. Misconduct has shown itself chiefly in the form of violent behaviour and wilful damage, in certain cases in repeated and deliberate pilfering, but no cases of sexual misconduct have come to notice. In practically all it may be said that the children have found lying a very present help in time of trouble, and the lies have often been of an unnecessary character, which would inevitably be detected. In general, the type of behaviour is that of the spoiled child of six or seven ; even with careful management the re-establishment of normal behaviour has been slow and more troublesome than in younger children, while in very many the future has been gravely imperilled by alternate undue petting and unreasonable punishment, which has produced a secondary spirit of rebellion, rationalized by the subject as entirely due to the cruel behaviour of companions or parents. Owing to the impairment of attention set up by the original illness, the subsequent psychoneurosis is very difficult to dislodge.

Ordinarily, the cases showing most conduct disturbances have exhibited the fewest physical signs, but in at least two a progressive degeneration in the direction of the Parkinsonian syndrome has been evident after a time.

So far as the effects of treatment could be observed the most important feature has been the benefit following removal to a fresh

environment, away from all fuss. Success has been obtained both in residential schools and by boarding out in private families ; but great difficulties attend the provision of such care, since neither schools nor foster-parents seem disposed to undertake a second case after their initial experience.

Short Notes and Clinical Cases.

UVEO-PAROTITIC PARALYSIS.

By H. J. MACBRIDE, LONDON.

THE case described below in detail is one of a rare disease in which an inflammatory process of the anterior segments of the uvea, and of the parotid, is associated with peripheral neuritis, the latter involving the cranial nerves, usually the facial, and occasionally the nerves of the limbs and trunk.

This rare syndrome was apparently first recognized as a definite clinical entity in 1909 by Heerfordt,¹ who described three cases in his article entitled "On a Subchronic Uveo-parotid Fever, localized in the Parotid Gland and the Uvea of the Eye, and specially complicated with Paresis of Cerebrospinal Nerves." Heerfordt refers to other cases which, in his view, belong to the same syndrome. In a recent number of this JOURNAL, Feiling and Viner² again brought the syndrome into prominence by the description of a typical case under the almost equally elaborate title of "Iridoeyelitis-Parotitis-Polyn neuritis: a New Clinical Syndrome."

The recording of another case in this article gives me an opportunity for suggesting that the disease might be described by the shorter yet appropriate name of "Uveo-Parotitic Paralysis."

DESCRIPTION OF CASE.

The case is that of a married woman of forty-three, who was first seen in the out-patient department of the National Hospital, Queen Square, by Dr. Kinnier Wilson, and was later admitted under his care on August 27, 1923. Its salient features are summarized in the following account.

The illness began in November, 1922, when the whole of the right side of the patient's face and forehead had become "itchy"; at the same time her skin all over took on a yellowish tinge. This lasted for about two or three weeks, but was not accompanied by fever. About the same time a pain in the right side of the abdomen, of which she had complained at intervals for nearly two years, greatly increased in intensity and led to the operation of appendicectomy in December. Three weeks later the patient suddenly began to have pains in both legs, with a "pins-and-needles" sensation, which extended from the feet to the hips. When she attempted to walk, her legs

gave way and she fell. The weakness of the legs continued for three weeks, as also did the paræsthesiæ.

In the middle of January, 1923, while the legs were still affected, "humps" appeared on both cheeks, just in front of the ear and below the mandible on both sides. These "humps" were larger and more painful on the left than the right side, and were associated with mild fever. With the appearance of the swellings both eyes became painful, and, in addition, the conjunctiva of the right eye was injected, while the left was normal in this respect. Vision became misty in both eyes, but with the subsidence of the swellings this improved slightly. By the middle of February the swellings had entirely disappeared and only slight mistiness of vision in the right eye remained. The patient noted, however, that a circular shadow about the size of a penny was present in front of the right eye. The pain at the back of the right eye continued.

On account of pyorrhœa, some teeth were extracted under gas in the middle of February, some more two weeks later, and the remainder three weeks after that. After the second lot were extracted the patient was fevered and had a sore throat. Three weeks after the final extraction, on April 6, stiffness was felt on the right side of the face and with it pain of a "red-hot needle" type, extending all over the head. On April 7 the left side of the mouth was pulled up, and she could not close the right eye properly; in other words, the right side of the face was paralysed. There was also slight deafness of the right ear. The facial palsy improved and became practically well in July. With this improvement the pain at the back of the right eye disappeared, as did to a great extent the mistiness of vision and the shadow.

About the middle of August, however, the left side of the face suddenly became paralysed, with drawing up of the right corner of the mouth. The left eye could not be closed, and there was slight deafness of the left ear. Accompanying the left facial palsy was pain at the back of the left eye, and very bad dysphagia. This dysphagia had not been present with the right facial palsy. A shadow, similar to that seen with the right eye, was now seen with the left. Two days after the facial paralysis began the patient felt generally weak.

Just before admission to hospital, on August 27, she became unsteady on her feet, was fevered, and vomited undigested food. This only lasted one day.

Ever since the patient had her teeth extracted she has suffered with pains between the shoulders and in the pit of the stomach, but she only vomited on the occasion already mentioned. Headaches have been more or less constant since the right facial palsy commenced. Diplopia has never been noted.

Paræsthesiæ were present, as already described, at the beginning of her illness. Two or three weeks before her admission to hospital there was numbness at the tips of the middle three fingers of the left hand, which has never quite disappeared. During these last few weeks there has been a sharp pain from the tip of the fourth finger of the left hand to the shoulder. This pain lasted only a few minutes, but came on several times in the day.

Constipation has always been a source of trouble to the patient.

The previous history revealed nothing bearing on her present illness

except that she had mumps as a child. The family history was similarly unimportant.

STATE ON EXAMINATION.

On admission the patient was seen to be small and poorly nourished, though the abdomen was fairly well covered. Her complexion and skin generally were of a yellowish colour, but she stated that her mother's and father's people all had this sallowness. On the right side of the abdomen was the linear scar of the appendicectomy operation. No enlargement of any glands could be found. Tenderness was discovered only in the left mastoid region. There was no sign of any ductless gland disturbance. The patient's intelligence and memory were normal, and there were no delusions or hallucinations, or emotional overaction. The respiratory, cardio-vascular, alimentary and genito-urinary systems were normal.

Cranial Nerves.—Visual acuity was R. 6/9, L. 6/12. The fields and fundi were normal in all respects. The pupils were equal and central, though not quite circular. The pupillary edge was slightly irregular, and on ophthalmological examination small opacities were found well forward in the vitreous. Free action of the pupils to light and accommodation was present. The other cranial nerves were unaffected, except for the slightest diminution to cotton wool stimuli over the second and third divisions of the left fifth, and the marked weakness of the left side of the face of the peripheral type. Slight weakness remained in the right side of the face, with a tendency to contracture. Taste and smell were unaffected.

The *sensory system* revealed no abnormality except that mentioned in connection with the fifth cranial nerve.

The *motor system* was unimpaired, and the reflexes were normal.

The *cerebrospinal fluid* was clear and colourless, with 8 cells per c mm.; large mononuclears about 5 per cent.; total protein 0.03 per cent.; Nonne-Apelt test, a faint haze; Lange test, no change in any tube. The Wassermann reaction was negative in the fluid and the blood.

The blood culture was sterile after seventy-two hours, as was also the culture from the conjunctiva. A fairly long chained streptococcus was obtained from a throat swab.

Blood Count.

Reds	3,950,000 per c.mm.
W.B.C.s	11,730 per c.mm.
Hb.	85 per cent.
C.I.	1.
Polymorphs	74 per cent.
Lymphocytes	20 per cent.
Hyalines	6 per cent.

Figs. 1 and 2 show the appearance of the patient's face at the time of admission to the hospital. It will be seen that the left side of the face was severely paralysed. The weakness still remaining in the right side of the face can also be observed. Incidentally, it may be remarked that when an attempt

was made to close the eyes, they deviated upward and to the right, instead of straight upward.

During the patient's stay in the hospital considerable further improvement has taken place and no fresh symptoms have appeared.

DISCUSSION.

The cardinal features of the case have been :—

1. Bilateral but asymmetrical inflammation of the eyes in the form of uveitis and conjunctivitis, coupled with the subjective appearance of



FIG. 1



FIG. 2

a shadow, first in the right and subsequently in the left eye, in the latter instance coinciding in time more or less with the facial paralysis.

2. Bilateral, symmetrical and synchronous parotitis.

3. Involvement of certain cranial nerves producing right, and later left, facial paralysis; in addition, there has been slight involvement of the fifth and tenth cranial nerves; and, finally, it may be hazarded that the slight deafness may have been due to eighth nerve affection, though it is possible that a degree of Eustachian obstruction may have accounted for this.

Negative features of the case have been the absence of definite peripheral neuritis, apart from the cranial nerve involvement, although the paræsthesiæ in the limbs mentioned above may fairly be taken to suggest that the peripheral nerves have not entirely escaped.

An interesting point in the case has been the curious variations of body temperature. Weekly rises took place, the highest of these being 101° F. The temperature charts, over a period of about six weeks, showed a mild resemblance to the charts of a case of Hodgkins' disease published by the late Sir James Galloway.³

There can, in my opinion, be no doubt that this is a case of uveo-parotitic paralysis, falling into the same group as the cases described by Heerfordt and by Feiling and Viner.

The order of appearance of the signs of the disease varied in the cases recorded. The eyes were the first to be affected in Heerfordt's first case, and in the one described by Mackay,⁴ but these two did not go so far as to have peripheral nerve involvement. The facial paralysis appeared to precede the parotitis and uveitis in the case of Feiling and Viner, while, in my case, there were signs of slight peripheral neuritis in the legs before the appearance of the parotid and eye disturbance, although the real nerve involvement took place some considerable time after the parotitis. Other cases had parotitis as their first sign. Thus, in the case of Daireaux and Pechin⁵ the eye affection appeared after the parotitis and two months before the nerves were affected. It can be seen that the cardinal signs of this disease may take place in any order. The occurrence of the facial paralysis three months after the parotitis resembles Dopfer's⁶ case, in which the facial paralysis developed two months after the parotitis. Heerfordt mentions a definite prodromal period of general malaise. In my case the period between November, 1922, and January, 1923, might justifiably be included as the prodromal period. In Heerfordt's first case it lasted as long as three months.

The case described resembles that of Feiling and Viner in the involvement of both sides of the face, one side shortly after the other, and in the occurrence of paræsthesiæ. Two of Heerfordt's cases showed dysphagia, as did this case. In one of his, paralysis of the recurrent laryngeal nerve was found on the left side. No rash was seen in this case, as described by Feiling and Viner and by Brewerton.⁷ In Heerfordt's first case optic neuritis was found, but there was no sign of this in mine, nor was there any disturbance of the oculomotor nerves.

Additional features exhibited in the present instance are the slight involvement of the fifth and eighth cranial nerves and the peculiar temperature variations. Heerfordt in one of his cases describes periodic rises of temperature, but does not give any details.

The ætiological factor of this disease must now be considered. We are not dealing with a case of mumps, for the following reasons: the patient had mumps as a child, and, according to a critical review by Feiling,⁸ one attack confers lifelong immunity, inasmuch as he was unable to find an authentic case of a second infection. Again, the patient was not aware of any cases of mumps in the neighbourhood when

her illness began. Further, the interval between the parotitis and the facial paralysis in this instance was considerably longer than what obtains in the case of mumps.*

Mention has been made of the slight similarity between the temperature charts in this case and those of Hodgkins' disease. Certainly several glands were affected, viz., the appendix, tonsils, parotid and ciliary body, but the writer is far from suggesting that this disease has any relation to Hodgkins' disease.

There can be no doubt that uveo-parotitic paralysis is of a toxic or toxi-infective nature, but its cause has not yet been discovered. Bacteriological examinations, in my case, revealed nothing except a long-chained streptococcus in the throat. One cannot accept this streptococcus as responsible for the disease, as it is acknowledged as a fairly common inhabitant of the throat in healthy people.

I wish to express my indebtedness to Dr. Kinnier Wilson for permitting me to publish this case and for many kind suggestions.

* Coureaud and Petges⁹ described facial paralysis in association with mumps, but the face was affected a very short time after the parotid.

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Editorial.

SUICIDE.

A PART from the problem of suicide and its prevention, which is constantly before the institutional psychiatrist, the daily press brings vividly before us how frequently this act occurs, often without seeming adequate cause. We are hearing much to-day of research in psychological medicine, but any encouragement in this sphere seems only to lie in the equipment of laboratories, where it is hoped that the scientific examination of physiological abnormalities will slowly, but surely, throw light upon the origin of the various forms of mental disease. We hear little or nothing in this country of stimulation to psychopathological research, and it is patent that only in such study shall we be able to elucidate the factors underlying the act of suicide, which involves a subject-matter of sociological as well as medical interest. Until recently, the taking of one's own life was regarded merely superficially, either as the result of an unaccountable impulse, or as the sequela of a depression brought about by a grave dissatisfaction with life. That there must have been something abnormal in the mental soil was presumed, but further than this few have seemed to care to investigate. This presumption of an inherent mental instability does not carry us far, especially so in that we find suicidal acts often occur in those where no trace of previous pathological symptoms was in evidence. Young children considered by their parents as normal in every way have, after a simple chiding, taken their own lives. Some deeper psychological knowledge on this question is patently needed in order that we may take prophylactic measures. In some psychotic conditions, such as manic-depressive states, we regard the patient as a potential suicide, and take steps accordingly, but in the manifold minor psychotic conditions which so constantly come before us, what indications have we for scientifically anticipating the possibility of an endeavour to terminate existence? The general practitioner especially, we feel, must be educated in such matters, because it is in his practice most commonly that advice is first sought, and it is upon his handling of the case that so much depends. Press reports at inquests frequently tell the same story. The deceased had consulted a doctor about his depression and insomnia, only to be told he was 'run down,' overworked,

that he had better take a rest, required a nerve tonic and 'must not worry.' Unless some obvious worry is spoken of, no psychic causation is dealt with, and the patient tends to be looked upon as uninteresting, and one whom the doctor would rather dispense with than dispense for. Though, without doubt, the patient desires to see a somatic cause for his suffering, he intuitively feels that there is another element which not only he himself cannot fathom, but that his doctor does not understand. We think it just this element of feeling that he is misunderstood by the last source of appeal—the doctor—that tends to break the ultimate link by means of which such a patient clings to life. It has been the experience of those who deal with such cases on up-to-date psychological lines that the danger of suicide is greatly eliminated if, during psychotherapeutic treatment, a hopeful attitude is taken up by the physician and instilled into the patient. Stekel has stated that suicide does not occur during psycho-analytic treatment, and that, though patients may threaten so to act, they do not carry out their threats as long as they cling to the analyst.

Two fallacious ideas are common in medical minds. One is, that if an individual talks of any suicidal impulse, he will not carry it out; and the other, that a psychoneurotic is safe from this tendency. It must be noted that any emotional idea is liable to pass over into overt action provided counter-inhibitions are lessened, and that unless the balancing forces are duly investigated it is impossible to adumbrate the resulting conduct. That psychoneurotics, referring mainly to those of an anxiety type, are unlikely to attempt suicide is obviously contradicted by the press reports already spoken of. In the majority of such cases no evidence of 'insanity' was brought forward, but to the psychological eye there were often seen situational factors which lent some colour to the view that a refuge from reality had been sought, even though the reason for it was largely unconsciously motivated. For obvious reasons the inquest verdict is that of 'suicide while temporarily insane,' but in strict phraseology such individuals for the most part are not 'insane,' that is, they were not legally certifiable or committable, and though subsequent to the act we presume some psychopathic abnormality, there is frequently found little evidence of this previously. Until of late years, through the work of the psycho-analytic school, no real glimmering of basic sources has been possible. The only conclusion that a highly experienced medical coroner could come to was expressed in the language of the poet who wrote:

"When all the blandishments of life are gone,
The coward shrinks to death, the brave live on."

It is manifest that in a suicidal individual there must be a grave derangement of the normal desire to live, which may, or may not, be

evidence of a definite psychosis. From his analytic studies, Clark sees herein a withdrawal from a normal adaptation to reality, and an increase of intrapsychic tension formed from the conscious and unconscious conflicts, which usually resolves itself into what is called a sin either of commission or omission. If the unconscious and infantile claim is sufficiently great, and the mental regression goes deep enough, we obtain the fundamental solution in self-destruction, not because there is a conscious desire for such, but because the dynamic fixation of infantile attachment decides it. This is usually formulated directly as the call of the parent or loved one, or as the still more insistent demand of the Supreme Being. Sane suicides Clark regards as having the same psychology as the psychotics.

There seems no doubt, when we study the unconscious motivation, that the essence of the mental conflict is an ethical or religious one, both of which are probably woven together. A sense of guilt, when not in any way a conscious factor, probably always lies beneath the surface, and inextricably combined with this lies a motive of self-punishment. That sexuality in some form or another has often intimate relationship with suicide is undeniable. The renunciation of love is frequently the obvious precursor, and, in this, the principle of revenge upon the love-object may enter in with the idea that the death will lay at their door and so bring life-long remorse. Not uncommonly, however, the renunciation refers to infantile attachment which only analysis can reveal. Psychotherapists are fully aware of the sense of guilt arising from onanistic practices, and it is known that relapse after abstinence is not infrequently a causative factor in suicide. Statistical examinations strongly confirm this intimacy of suicide with the manifold factors involved in sex life. The fear of insanity, which is often seen to play an important causative rôle, would be analytically explained as a fear of repressed unconscious conflicts which are in danger of breaking through into awareness, and thus becoming conscious of guilt. Should guilt have its source in repressed hostile wishes, we can understand how closely homicide and suicide may be related. The two acts, in fact, frequently follow upon each other. Freud has lately postulated a highly interesting speculative hypothesis that there is an innate 'death instinct,' which urges us to reach a state in which there is a relief of all tension, a Nirvana. It is possible, therefore, that the sex or life instinct acts as a stimulus to face reality, but given sufficient impediment to the demands of Eros, there may be such regression that the death instinct comes into play. Such an hypothesis only tends to confirm what we previously said, namely, that one aid in the prevention of suicide lies in sustaining some objective attachment. In the young we also may, perhaps, do something prophylactic through parental education. Too much love during the formative years may render an individual so greedy of

affection that, in after life, he becomes incapable of living without it, and, also, such an exaggerated early love life tends to a parental fixation which, when repressed, brings guilt in its train, and morbid depression later from its necessary renunciation. Where the great fundamental problems of the human psyche require elucidating, our task seems so great that we are apt to attempt solutions on a superficial plane. Enough work, however, has been done to show that further efforts may be fruitful, and that a greater dissemination of the knowledge already gained should, in its practical application, do something towards obviating many an act of self-destruction.

Abstracts.

Neurology.

NEURO-ANATOMY AND NEUROPHYSIOLOGY.

- [103] The central tract of the hypoglossus nerve (Über die zentrale Hypoglossusbahn).—Professor G. MINGAZZINI. *Jour. f. Psychol. u. Neur.*, 1923, xxix, 273.

PROFESSOR MINGAZZINI has made a valuable contribution to a somewhat vexed subject, based on numerous experiments in apes, with careful anatomical investigation. The paper is extremely long and detailed, and is not summarized in any convenient way by the author. It contains much information of interest to the anatomist and neurologist. Only some of his findings can here be alluded to.

The author divides the hypoglossal nucleus into distal, middle, and proximal segments, with dorsal, dorsolateral, and ventral cell-groups in each. After extirpation of the twelfth nerve in the ape, the cells of the distal segment of the nucleus all disappear, those of the middle segment to a less complete extent, and those of the proximal segment still less. The pyramidal fibres going to the nucleus are connected chiefly with the dorsal group of the middle segment of the same side and the ventral group of the distal and the lateral group of the middle and proximal segments of the opposite side—classed together as 'Complex A.' This is, further, the chief source of origin of the root fibres of the nerve. Cell 'Complex B,' on the other hand, largely made up of the remainder, is connected to a less extent with the roots of the nerve, has other central relations, and is associated with sensory collaterals from bulbar nuclei. Its chief central connection is with the homolateral corticobulbar path, and some of its fibres probably join the vagus group.

Mingazzini's researches render doubtful the separate existence of a nucleus of Roller, at least in the macaque, and the same is true of the nucleus of Duval. The cells and fibres of the nucleus intercalatus of Staderini are apparently reduced after extirpation of the hypoglossal, and seem to be affected *pari passu* with rarefaction of the plexus perinuclearis of the twelfth nucleus.

The experiments do not throw much light on the question of the origin of the ansa hypoglossi; if anything, they do not support the hypothesis of the unique cervical origin of that nerve. The twelfth nucleus certainly extends into the uppermost cervical segments.

No experimental support for the view that the orbicularis oris is innervated *viâ* the hypoglossal nucleus or nerve has been obtained.

The plexus endonuclearis of the twelfth nucleus is made up of the dendrites of the nuclear cells of the same side and the terminals of the pyramidal hypoglossal fibres from the opposite side, while the plexus perinuclearis is

composed of the dendrites of the same cells and of those of the nucleus intercalatus.

Axones arise from a group in the twelfth nucleus which leave the hypoglossal to join the vagus and the recurrens and innervate the abductors of the vocal cords.

Mingazzini has been unable to determine the exact path of the pyramidal fibres *via* the mesial fourth of the crus and the most dorsal division of the pontine group of the same, to the particular group of the hypoglossal nucleus of the opposite side.

The whole paper deserves discriminating study by the anatomist.

S. A. K. W.

[104] **The nature of the vibration sense** (Über die Natur des Vibrations-sinns).—KATZ. *Münch. med. Woch.*, 1923, lxx, 706.

IN this interesting article Professor Katz discusses the means by which we become cognizant of vibratory stimuli, and he also recalls a number of pertinent historical facts.

As long ago as 1846 Weber thought he saw, in our interpretation of stimuli succeeding each other faster and faster, a transition from the sense of touch to that of hearing: what was at first recognized by the finger as a series of touches was finally, as its frequency increased, taken up by the ear as a musical note.

In 1856 Hondin applied the knowledge of the recognition of vibration in teaching deaf children to talk. According to his method the pupil places his fingers on the larynx of a person speaking or singing, and thus he obtains an example which he can appreciate and follow.

In 1869 v. Wittich published an account of experiments on the recognition of the vibration of a tuning fork. Before that he had produced the sensation of vibration by means of rotating discs bearing regularly arranged elevations: other experimenters had used monochords, reed pipes, toothed wheels and weak alternating currents.

In 1892 Ewald made an observation which may be placed beside that of the recognition of vibration by deaf children. It was that pigeons in which the cochlea and labyrinth had been destroyed were still responsive to sound stimuli.

When we come to consider the means by which we recognize vibration there are many observations which point to the existence of a vibration sense independent of the senses of pressure, touch or hearing. Vibration is best felt on those parts of the body where the skin is more tightly stretched or where bone lies close to the surface. That we are not dealing with intermittent pressure or touch will be evident if the base of a fork be touched lightly with the finger while the fork is at rest and again when it is vibrating; the feeling of vibration comes as a new component of the total sensation: it is not felt as a rapid periodic increase and decrease of stimulation in the way that the flickering of a light is recognized by the eye. Again, it has been found that if the interval between two pressure stimuli be less than .0255 ($= \frac{1}{39}$) sec., they are not recognized as distinct, but fuse into one pressure sensation: but vibratory stimuli are recognized up to frequencies of over

500 per second. Not only is the vibration recognized, but if two forks differ in pitch by a tone or more, their vibrations can be distinguished from each other by the finger. This faculty of distinguishing notes by the finger may even be cultivated, and in deaf children sometimes becomes very acute.

If we admit the existence of a separate vibration sense, many instances of its employment can be given. Katz believes that we rely on it to a very great extent when we tell the nature of a surface or material by moving a finger over it. When we do so vibrations certainly occur, for in many cases a slight noise—rustling or grating in character—is produced. The superiority, too, of the moving finger over the stationary one is known. Touch alone cannot be sufficient, for the differences in elevation on fine materials are much too small to be appreciated by our touch organs. In fact, touch can often be dispensed with; if a short stick be held between the fingers and rubbed on various surfaces, these can be distinguished and their nature can usually be recognized.

The vibration sense frequently also supplements our hearing; e.g., when we become aware of vehicles passing in front of our houses. Like hearing, the vibration sense is responsive to stimuli transmitted from a distance. Probably the animal organism learned to recognize vibratory stimuli long after it had known touch, and long before it knew sound.

To the objection that no central organ for the reception of vibratory stimuli is known, Katz answers that it will be time enough to look for it when we have found separate organs for the recognition and distinction of touch, pressure and temperature. He mentions, incidentally, Frank's conclusion, that vibratory stimuli are conducted to the brain by special fibres lying in the motor tracts.

J. P. M.

NEUROPATHOLOGY.

- [105] The cerebrospinal fluid in adult cases of tuberculous meningitis (Le liquide céphalo-rachidien dans la méningite tuberculeuse de l'adulte). — GEORGES BICKEL. *Arch. Suisses de Neur. et de Psychiat.*, 1923, xii, 269.

THIS important paper is a review of the examination of the cerebrospinal fluid in eighty-two adolescent and adult cases of tuberculous meningitis. One hundred and eighty-nine specimens of cerebrospinal fluid were carefully examined, and the results are recorded in so concise a manner that it is almost impossible to give a short summary of them.

The *appearance* of the fluid was clear in 132 specimens; there was a haze in twenty-one, and a turbidity in eight. Turbidity often appeared in later punctures when the earlier fluids had been clear. The *pressure* was always raised but sometimes fell towards the later stages of the disease. *Xanthochromia* was present in twenty-two of the fluids, and was associated with the presence of red blood corpuscles in two cases. *Tubercle bacilli* were found in the majority of fluids (exact number not stated), and were combined with other organisms in three cases. The *cells* varied from 0 to 1,400 per c.mm., with an average of 230. They were mainly lymphocytes in the great majority

of fluids, but in 20 per cent. of the cases the earlier fluids showed a predominance of polymorphonuclear cells: these disappeared towards the end of the disease, not only in the purely tuberculous cases, but also in those with a mixed infection.

The *protein* was estimated in 170 fluids from seventy-six cases by Esbach's method. Readings from 0.025 to 0.475 per cent. were obtained, the average being 0.152 per cent. The protein tended to increase with the ingravescence of the disease, and often fell slightly during the mild remissions which were sometimes observed. The only reading above 0.4 per cent. was in a fluid obtained shortly before death from a case of associated tuberculous and meningococcal infection. The protein often increased along with the number of cells, but this was not always the case. Not infrequently the cells were raised at an early stage of the disease when the protein remained within normal limits. On the other hand, at a late stage in the disease the cells were occasionally scanty (18 per c.mm.) and the protein abundant (0.4 per cent.). In two cases there was no excess of either protein or cells.

The *chlorides* were examined in thirty-six fluids. In all they were below normal, but the very low readings which are pathognomonic of the disease were rare. Thus in only nine cases did they fall below 0.610 per cent.: in fourteen they were between 0.610 and 0.650, in ten between 0.650 and 0.700, and in two slightly above 0.700 per cent. The *sugar* was only estimated in ten fluids and lay between 0.006 and 0.03 per cent. The percentage of both chlorides and sugar was found to fall steadily during the course of the disease.

The *meningeal permeability to nitrates* was examined in five cases and was always found to be raised, the amount passing into the cerebrospinal fluid three hours after the ingestion of sodium nitrate (1 gm. for each five stones of body weight) lying always between 0.004 and 0.0075 per cent., the normal being 0.001. In one case the permeability was found to increase from 0.0055 to 0.0075 per cent. during the course of the disease.

Unexpected recovery took place in one of the author's cases in which, at the height of the disease, tubercle bacilli were shown to be present both microscopically and by animal injection. At this stage the cerebrospinal fluid was typical, with 280 cells per c.mm. (60 per cent. lymphocytes), protein 0.3, chlorides 0.595, glucose 0.018, urea 0.02, permeability to nitrates 0.0065 per cent. From this time on the patient and his fluid showed progressive improvement, the first definitely hopeful sign being the rise in the percentages of glucose and chlorides, neither of which shows any marked change during the common slight remissions of the disease. A month from the beginning of the illness the patient showed a complete clinical recovery, but the cerebrospinal fluid was still profoundly altered, containing forty-four cells per c.mm. (92 per cent. lymphocytes), 0.08 per cent. protein, 0.635 chlorides and 0.037 glucose. The permeability to nitrates, which had remained at the high figure of 0.0055 per cent., fell rapidly almost to normal. For several months more the cerebrospinal fluid continued to show about ten cells per c.mm., and a diminution of chlorides and glucose. As this, so far as the reviewer knows, is the first non-fatal case of tuberculous meningitis in which careful chemical examinations of the cerebrospinal fluid have been made, it has been thought worth while to record them fully.

J. G. GREENFIELD.

- [106] The pathology of tumours of the cerebellopontine angle (*Zur Pathologie der Kleinhirnbrückenwinkeltumoren*).—NISHIKAWA. *Arbeit. a. d. neurolog. Inst. Wien. Univ.*, 1922, xxiv, 185.

IN this, his second article under this title (see this JOURNAL, August, 1923), Professor Nishikawa deals with the changes produced in the cerebellum, pons, and medulla by tumours in the cerebellopontine angle.

In many cases there was a great increase in the size and number of the blood vessels in the whole field around the tumour; sometimes the vessels showed changes in their walls—weakening of the intima, hyaline degeneration or simple thickening of the wall; thrombosis was frequently found, and at times the occlusion of a vessel in this way seemed to have been the cause of necrosis of brain tissue in the area of distribution of the vessel.

In the cerebellum, besides these changes in the vessels, there were in some cases areas of hæmorrhage and blood spaces in communication with arteries; in other cases the tumour itself had invaded the cerebellum, either massively or by tentacles growing along the vessel sheaths; in other cases, again, areas of softening were found, and slighter degenerative changes due to pressure.

In the pons most cases presented a slight œdema, but the fibre tracts and nuclei in the deeper parts seemed to have escaped injury. But in the pontine peduncle of the cerebellum, situated in proximity to the tumour, there were areas of partial degeneration, the myelin sheaths apparently being destroyed while the axis cylinders escaped; in other cases the peduncle had been attacked by the growth and seemed to have been the path of invasion of the cerebellum.

In the medulla the involvement was much more serious and extensive. The whole area corresponding to the distribution of the posterior inferior cerebellar artery had in one case undergone softening; this was a case in which operative interference had been quickly fatal; the softened area included the nucleus of the vagus nerve.

Nishikawa draws from his studies three practical conclusions: (a) that death after operation for cerebellopontine tumour may be due to the peculiar vascular conditions existing at and around the site of operation; (b) that as some of these tumours invade the cerebellum extensively (and are probably diagnosed earlier on that account) it must in some cases be considered whether the operation should not be planned as for a cerebellar tumour; (c) that no operation should be undertaken in any case in which there are definite signs of medullary lesion. It is recognized, however, that the question whether certain symptoms are produced by affection of the medullary nuclei themselves or by that of the nerve roots which arise from them is usually extremely difficult to decide.

J. P. MARTIN.

- [107] Syphilis of the small cerebral blood vessels (*La syphilis des petits vaisseaux du cerveau*).—URECHIA and ELEKES. *L'Encéphale*, 1923, xviii, 240.

THE authors detail a case of chronic syphilitic disease of the brain corresponding to the type described by Nissl and by Alzheimer as 'diffuse cerebral

syphilis.' In this condition the brain is usually reduced in weight and the meninges are thickened, but the histological changes differ in many respects from those of general paralysis. There is little perivascular round-celled infiltration, but, on the other hand, the walls of the smaller vessels show proliferation of both intima and adventitia, often with disappearance of the media, and fragmentation or proliferation of the elastic lamina. The nerve cells present chronic alterations; sometimes neuronophagy is intense. The neuroglial cells are swollen, and have large nuclei, but new formation of neuroglial fibres is scanty, in contradistinction to the condition found in general paralysis where the neuroglial overgrowth is largely fibrous in character. In the authors' case there was also calcareous infiltration in the lenticular nuclei, affecting chiefly the adventitia of the vessels but sometimes infiltrating all the coats and even penetrating into the interior of the vessel to form 'actual stalactites.' In addition, small round dots of calcium salts were found scattered through the tissues and grouped in the neighbourhood of the capillaries.

The nature and pathogenesis of this calcareous infiltration is discussed, and a short but exhaustive review of the literature dealing with the subject is given. The authors take the view that the lime is in the form of a colloidal combination with iron and fatty acids, and that its deposition is due to diminished alkalinity of the blood.

That the condition was of syphilitic origin in this case was proved by the presence of syphilitic aortitis and nephritis, although the Wassermann reaction was constantly negative both in blood and cerebrospinal fluid.

J. G. GREENFIELD.

[108] **The mode of transference of infection in congenital syphilis** (Über das Problem der Übertragung bei der 'Lues Congenita').—SALOMON. *Münch. med. Woch.*, 1923, lxx, 630.

It is no longer held that syphilis is a hereditary disease in the strict sense of the term: either the ovum becomes infected from the father at the time of its fertilization—in which case it almost certainly dies long before term—or the fetus becomes infected subsequently from the mother.

Colles' law that the mother may escape infection and yet bear a syphilitic child cannot be sustained in the light of modern investigation: for Trinchese found spirochaetes in plenty in the decidual (and therefore maternal) part of the placenta, even in cases where the mother's blood gave a negative Wassermann reaction. While this shows that the mother does not escape, it does seem, nevertheless, that her infection may be of a peculiarly mild type; Salomon suggests as an explanation of this that pregnancy, in much the same way as the modern non-specific pyrexial treatment, may have a favourable influence on the course of syphilis.

Profeta's law, that a syphilitic mother may bear a non-syphilitic child, became untenable when the Wassermann reaction was introduced: though infection may not be apparent in the child it can be detected in his blood; it is certain, too, that no immunity is conferred upon the child by the mother and that no immune bodies pass to him from her blood.

The infection of the child may occur (1) at any time during gestation, or (2) during parturition, either (a) by the placental route or (b) cutaneously.

Salomon concludes that though a man with a positive reaction in his blood may beget healthy children, it is not to be expected that a woman with a positive reaction in her blood will bear healthy children, and she should not therefore be allowed to marry.

J. P. M.

[109] **Disintegrative lacunæ in cerebral arteriosclerosis** (Le lacune di disintegrazione nell'arteriosclerosi cerebrale).—G. PELLACANI. *Riv. di pat. nerv. e ment.*, 1923, xxvii, 673.

THERE is a variety of causes for the formation of lacunæ in cerebral arteriosclerosis. The type described by Marie seems to be due to a perivascular proliferation which corrodes the surrounding nervous tissue. This sometimes leads to rarefaction but more often to a proliferation of neuroglia in the vicinity: the connective tissue tends to break down in the centre, and this brings about the formation of lacunæ. Small circumscribed lacunæ such as are seen in chronic subcortical encephalitis are due to reabsorption of small perivascular hemorrhages and to the softening of miliary thrombi. The 'cribriform' condition described in the cerebral white matter of general paralytics, senile dementes and also epileptics, depends on interference with perivascular lymphatics and the dilatation of lymphatic spaces round the small arteries.

'L'état vermonlu' described in senile dementia, consisting of cortical circumscribed areas of softening or cavities surrounded by a dense layer of neuroglia, is due to necrosis following on occlusion of blood capillaries. There is no demonstrable difference in the clinical picture accompanying these various forms of degenerative change.

R. G. GORDON.

[110] **Lesions caused by histamine in the nervous centres of the rabbit** (Lesioni provocate dall'istamina nei centri nervosi del coniglio).—V. M. BUSCAINO. *Riv. di Patol. nerv. e ment.*, 1923, xxvii, 641.

THE author believes that the pathogenesis of certain morbid processes such as those of dementia præcox, amentia, the chronic form of encephalitis lethargica, Parkinson's disease, progressive muscular atrophy, and perhaps Wilson's disease, consists of an intoxication by the amine compounds.

The effects of intravenous and subcutaneous injections of histamine into animals are described. They consist in profound disturbances of the vegetative nervous system, such as stimulation of smooth muscle fibre, salivation, asthma, lowering of blood pressure, etc. The author conducted experiments by injecting rabbits with histamine and examining their nervous systems, and found areas of degeneration similar in character and distribution to those met with in dementia præcox, both in the glial tissue of the central nervous system and in the liver. A dark precipitate was obtained in the urine treated with silver nitrate. Similar conditions have been described in the other disease processes mentioned above, and it is significant that the lesions in the rabbits experimented on were confined to the basal ganglia and the mesencephalon. He concludes that these degenerative diseases are due to the presence in the circulation of an abnormal basic substance, probably histamine.

R. G. GORDON.

- [111] **Hypertrophic tuberous sclerosis** (Über tuberöse Hirnsklerose).—
 POLLAK, *Arbeit, a. d. neurolog. Inst. Wien. Univ.*, 1922, xxiv, 93.

THIS is a long article in which the detailed description of the pathological findings in the brain in a case of hypertrophic tuberous sclerosis is followed by a discussion of the etiology of the abnormalities observed.

The case was that of an infant aged fourteen months. The brain showed to the naked eye typical 'tubera' on the surface in the frontal and temporal lobes of both sides and in the right parietal lobe. On section of these nodules it was seen that they involved both the grey and the white matter, and that the grey matter in them was thinner than over the more normal parts of the brain.

On microscopic examination of the nodules, the grey matter involved in them was found to be a kind of miscarried cortex, i.e., the usual cortical elements were present, but in arrangement and in form they showed considerable disorder. As regards arrangement, it was impossible to make out definite layers of cortical cells. As regards form, both size and shape were very varied; the cells were multipolar, bipolar and unipolar; giant cells, some of them of enormous dimensions, were present in great numbers; many of these were definitely ganglion cells, others approached closely to the glial type; Pollak satisfied himself, however, that these latter were not true glial elements, and that they were to be reckoned with the ganglion cells.

In the white portion of the nodules, unusually small glial cells in great multitude dominated the microscopical picture, and there was also a great excess of glial fibres.

Passing from the nodules to the apparently normal parts of the brain, Pollak found giant ganglion cells in several parts of the cortex, and he also discovered great numbers of ganglion cells, some of large size, some of normal size, in the white matter in the internal capsule.

To explain his findings the author suggests that two separate pathological processes have been at work during development. The first he supposes to be some influence which at an early stage acted on the neuroblasts and spongioblasts in such a way as to pervert their properties of growth and to interfere with their biotaxis. This would explain the variations in form and size of the ganglion cells, the incomplete differentiation of some of them, and their presence in abnormal situations. The second process he takes to have been a focal reaction of the glia around the more abnormal cells—the usual glial reaction of the nervous system to damage of almost any kind; but owing to the perverting action of the earlier factor the glia is not true to type, and its cells show almost as much variation as the true nervous elements.

J. P. MARTIN.

- [112] **Creatinin metabolism in cases of muscular dystrophy** (Über den Kreatininstoffwechsel bei Muskelatrophie).—NEDELMANN, *Münch. med. Woch.*, 1923, lxx, 800.

SINCE the researches of Chevreul and Liebig, in 1847, creatin has been recognized as a constituent of muscle tissue and as the forerunner of the creatinin which is constantly present in healthy urine. The dehydration of creatin to

creatinin was generally supposed to be brought about by ferments, but in 1920 Hahn and Barkan showed that the change occurred spontaneously in an acid medium, if the degree of acidity was about the same as that normally present in the muscles of the body. The daily output of creatinin for a healthy man taking a creatin-free diet is about 1 grm., and if the diet be not only creatin-free, but nitrogen-free, the creatinin nitrogen amounts to between 18 per cent. and 26 per cent. of the total nitrogen output.

Since 1883 it has been known that in cases of muscular dystrophy the creatinin output is reduced. In 1909 Levine and Kristeller found that in muscular dystrophy and in conditions of muscular wasting generally, not only was the output of creatinin reduced, but creatin itself appeared in the urine. These findings were confirmed by other workers, both in this country and in Germany.

Nedehmann has now investigated the relation of the creatinin output to the total protein output in a case of muscular dystrophy. The patient was placed on a nitrogen-free diet and estimations were made daily from the sixth till the tenth day: the average daily excretion of creatin was just over 0.41 grm. (41 per cent. of the normal), and the creatinin nitrogen was only 9.9 per cent. of the total daily output, i.e., half the normal ratio.

J. P. M.

[113] The pathogenesis of Landry's paralysis (Studien zur Pathogenese der Landry'schen Paralyse). GRÜNEWALD. *Jour. f. Psychol. u. Neur.*, 1923, xxix, 403.

IN the view of the author, supported by full evidence, Landry's paralysis cannot be considered a clinical, pathological, or etiological entity. Yet, regarded as a syndrome, it is definite enough—an acute ascending (or descending) flaccid motor palsy, not always fatal, with occasional amyotrophy, occasional involvement of sphincters and vegetative centres, very occasional sensory changes. The unity behind this diversity is, in the author's opinion, to be sought in the preliminary state of the nervous system of the individual concerned, whereby resistance is lowered and reaction is merely passive.

In an interesting and well-considered discussion a search is made for the 'predisposing coefficient' of the syndrome. This consists in a state of 'toxæmia,' a 'sensitisation' of the neuraxis as the result of persistent toxæmia or the presence of foreign substances. The source of this preliminary sensitisation may be extrinsic or intrinsic, the latter, autointoxicative, group being exemplified by a large number of conditions (renal and alimentary toxæmias, polyneuritis gravidarum, idiopathic or recurrent polyneuritis, polyneuritis neurasthenica, polyneuritis ambulatoria, the polyneuritis of avitaminosis, etc.) in which it is clear that toxic action on the nervous system is taking place from some nidus in another somatic system. Thus prepared, the nervous system is prone to succumb to an acute invasion whatever the actual morbid agent.

Among these predisposing coefficients is to be numbered the comparatively rare condition of hæmatoporphyria, or porphyria, as it may shortly be called, and Grünewald gives a full description of a remarkable case of this kind, ending with the characteristic clinical picture of acute Landry's

paralysis. As in a previous paper of the same writer dealing with the same subject (see this JOURNAL, May, 1923, p. 51), it is to be regretted that the title of the communication conveys no information as to its interesting contents.

Summarized, the thesis is that Landry's paralysis is a special biological expression of differing morbid processes, of an unfavourable nature, in which behind the clinical symptoms lies a biological preliminary in the form of toxic action on a nervous system which reacts anaphylactically (allergically) by toxic over-sensitisation.

S. A. K. W.

- [114] Is the albumin-content of the cerebrospinal fluid different at different levels? (Bestehen Unterschiede in Eiweissgehalt des Liquor cerebrospinalis in verschiedenen Höhen?).—JACOBI. *Münch. med. Woch.*, 1923, lxx, 670.

It has been shown almost beyond doubt that the cell content of the cerebrospinal fluid is different at different levels, and that the cerebrospinal fluid as a whole is not to be judged in this respect by the result of a single examination. The question then arises whether similar variations occur in the albumin content. That such is the case has been suggested by the findings of Walter and others who carried out albumin estimations on consecutive samples drawn off at the same puncture. Eskuchen, Matzdorff and Schonfeld, however, have not been able to discover such differences.

The author of this paper attacked the question armed with a new method of examination: by means of the 'interferometer,' which determines optically the strengths of solutions, he examined, in each of his cases, five consecutive specimens of fluid taken at the same puncture. In this way he studied thirty fluids. His findings are in keeping with those of Walter, and tend to show that the albumin-content does vary slightly at different levels, and is usually highest in the first sample of fluid drawn off.

J. P. M.

SENSORIMOTOR NEUROLOGY.

- [115] Tremor in disease of the cerebellum (Über Tremor bei Kleinhirnaaffektionen).—LEIRI. *Jour. f. Psychol. u. Neur.*, 1923, xxix, 429.

AN old man of eighty-two suffered from a stroke, without loss of consciousness, which was followed on the fourth day by the appearance of pronounced intention-tremor of the right arm, the leg to a less extent, and of the upper part of the trunk, but excluding the head. At an autopsy two years later hæmorrhagic softening of the right nucleus dentatus of the cerebellum was found, with secondary degeneration of the superior cerebellar peduncle. The nucleus fastigii was intact, but the nuclei emboliformis and globosus were implicated. The right middle peduncle was also degenerated, and the contralateral inferior olive and olivo-cerebellar tract in the medulla.

Leiri thinks the intention-tremor of cerebellar disease is due to an attempt on the part of the cortex to correct exaggerated, hypermetric movement the result of the cerebellar lesion. The varying degree of representation in the

cortex of limb and head movements, in different members of the animal series explains the variation in the appearance of tremor during volitional innervation, as also its tendency sometimes to disappear.

S. A. K. W.

- [116] A case of hereditary cerebellar ataxy (Zur Kenntnis der hereditären cerebellarem Ataxie). CURSCHMANN. *Deut. Zeit. f. Nervenh.*, 1922, lxxv, 224.

CURSCHMANN briefly describes the case of a man of forty-one years of age, who for about five years had been suffering from progressive unsteadiness of gait, giddiness and disturbance of sight. The patient's grandfather had been a healthy man all his life and lived to the age of eighty-eight; the patient's father, however, had developed an unsteadiness of gait at the age of fifty-two, and his sight had become poor; the patient's uncle, also, had suffered from 'staggering' and weakness of sight from about the age of fifty, and a son of this uncle has already begun to be unsteady, though just over twenty years of age.

The patient had a brother and two sisters, all of whom were healthy.

Examination revealed the following objective signs: well-advanced optic atrophy, marked nystagmus, brisk tendon jerks, weakness of the abdominal and absence of the cremasteric reflexes, normal plantar responses: there was no loss of power in any limb and no sensory disturbance. The control of the arms did not appear to have suffered in any way in either this patient or his relatives, so that several of them were still able to carry on sedentary occupations requiring fine hand movements.

In the absence of signs of posterior or lateral column involvement, Curschmann regards the symptoms as purely cerebellar in origin, and classes the case as one of the hereditary cerebellar ataxy described by Marie.

J. P. M.

- [117] Chorea cruciata; differential diagnosis between striatal and cerebellar chronic chorea (La chorée cruciata: diagnostic différentiel des chorées chroniques d'origine striée et d'origine cérébelleuse).—LHERMITTE and BOURGUIGNA. *L'Encéphale*, 1923, xviii, 228.

THE pathological findings in Sydenham's chorea, as in choreas consecutive to infective disease, e.g., post-encephalitic, are so diffuse as to be of little use for the purposes of pathological physiology. In this respect less exception can be taken to cases of chronic chorea, with or without mental accompaniments. These are the expression of a lesion of double polarity—cortico-frontal and striatal (putamen-caudate). According to Marie and Lhermitte, the frontal lesion is responsible for the mental changes and the striatal for the chorea. The author rejects absolutely the hypothesis of a cerebellar origin (superior cerebellar peduncle) for the choreiform movements of Huntington's chorea, but accepts such an origin for certain other choreas. It is noteworthy that lesions of the dentate do not appear to be followed by choreiform movement, and that in the case of the superior cerebellar peduncle the lesion is commonly in the vicinity of its crossing (Wernick's commissure). Further, the authors consider such chorea is never derived from lesions of the red nucleus, but are

doubtful whether in certain instances chorea may not have a thalamic source. (Incidentally, the reviewer draws attention to the doubtful nature of any hypothesis which would assign symptoms to disease of a nerve-tract but not to the grey matter of its origin or termination.) Further, the authors do not mention the difficulty arising from the association of lesions of the superior cerebellar peduncle with tremor.

Among the symptoms accompanying chronic chorea, and assigned by the authors to disease of the corpus striatum, are dysarthria, spontaneous akinesia, and loss of automatic movement. Their case is that of an old lady of eighty-six, with severe choreiform movement of the left arm and hand, and of the right foot. The face was the seat of grimaces, especially on the left side. The movements had come on suddenly, and were accompanied by obvious cerebellar symptoms—adiadochokinesis, dysmetria, hypotonia, etc. The suggestion is that the lesion was situated at or near Werneckin's commissure. *Quâ* chorea, the movements are distinguished from those of striatal origin only by the association of cerebellar signs with them, according to the authors. Chorea cruciata is ingeniously suggested on the analogy of hemiplegia cruciata.

S. A. K. W.

[118] **Pontocerebellar glioma** (Gliome de l'angle ponto-cérébelleux).—ANDRÉ-THOMAS. *L'Encéphale*, 1923, xviii, 281.

THE case here described appeared clinically to be one of eighth nerve tumour, but proved at autopsy to be a cystic glioma, growing from the anterior part of the left cerebellar hemisphere and extending into the ponto-cerebellar angle and over the front of the pons and medulla. Although the trigeminal nerve was lapped round the tumour, the only cranial nerves showing clinical evidence of involvement appear to have been the sixth, seventh, and eighth. The case presented during life the phenomenon of 'pendular knee-jerk' described by the author, and was one of the first in which he had observed this sign. He describes it as a 'passivité' of the antagonistic muscles of the thigh, and uses this term in preference to 'hypotonia,' which is also used to describe a condition of hyperextensibility of muscles, a phenomenon not present in the 'passivité' of cerebellar origin. The author's work on this subject, as also that of Holmes and Stewart, to which he draws attention, is well known.

J. G. GREENFIELD.

[119] **A case of cerebral tumour with apraxia, agraphia, and alexia** (Contribution à l'étude de l'apraxie : un cas de tumeur du cerveau ayant déterminé de l'apraxie, de l'agraphie, et de l'alexie).—PAPADATO. *L'Encéphale*, 1923, xviii, 253.

THE case is that of a young man of twenty-eight, with the usual symptoms of intracranial tumour. Homonymous right hemianopia, right hemianæsthesia, alexia and agraphia suggested a localization in the left parieto-occipital region, duly confirmed by autopsy.

The patient exhibited well-marked motor apraxia, and the type of defect shown leads the author to regard so-called ideational and motor apraxias as clinically indistinguishable.

It seems certain that lesions of the supramarginal gyrus and vicinity are of themselves capable of giving rise to apraxia, usually bilateral; unilateral apraxia (left side) is commonly the result of callosal lesions. The author's discussion is of interest, but his conclusion that supramarginal apraxia is a 'sensory apraxia' in reality, due to disorder of the sensory components in the images of movements, is open to objection.

S. A. K. W.

- [120] The etiology of a tic developing fifteen months after an atypical lethargic encephalitis (Discussion sur l'étiologie d'un tic survenu quinze mois après une encéphalite léthargique atypique).—DE SAUSSURE. *Arch. Suisses de Neur. et de Psychiat.*, 1923, xii, 298.

THIS is a curiously interesting clinical document, in which the sequence of events was somewhat as follows: In February, 1920, a young woman of twenty had an attack of influenza, followed in a few days by convulsions, hallucinations, psychomotor agitation, inversion of sleep rhythm. The acute stage soon passed, but for no less than fifteen months the insomnia persisted, and during the same period amenorrhœa was noted. In May, 1921, an emotional shock rather upset the patient, and within a day or two incessant yawning (every two or three minutes) developed, associated with an overwhelming desire for sleep. The yawning continued for fifteen days, and was followed in turn by intense bilateral neuralgia of the face and by bilateral spasm of the lower facial musculature, including the platysma and sometimes the sternomastoid. During the spasm respiration ceased and a brief period of polypnea ensued. The pain associated with the spasm was exceptionally severe, and persisted for about two months. Later in the year the patient's mental condition rather deteriorated, irritability increased, and coprolalia developed, suggestive of Gilles de la Tourette's disease. She was removed to an asylum in December, 1920, and since has spent three periods there, her involuntary movements continuing in a more restricted fashion, the spasm becoming a tic, and her mental state remaining unchanged. Since February, 1920, the menses have appeared only three times.

The discussion given by the author is instructive though inconclusive, and is illustrated by many useful references to the literature.

S. A. K. W.

- [121] Total immobilization in the extremities through hypertonia after epidemic encephalitis.—K. PETREN and L. BRAHME. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 105.

A FULL description is given of a case in which the patient became so completely 'paralysed' that he could make no movements except those of the eyes, swallowing, and respiration, nor could his trunk or limbs be moved passively. This differentiated the condition from catalepsy, which has been described as occurring after encephalitis. The Babinski sign was never positive, nor were there any indications of pyramidal tract involvement. This suggests that extra-pyramidal motor lesions may produce an excessive spasticity which, in the case quoted, is said to have been far greater than that found in even severe cases of Parkinsonian rigidity. In some of the latter new bone-

formation has been found similar to that described by Dejerine-Klumpke and Ceillier in injuries to the spinal cord, where the ossification was preceded by œdema and showed no signs of amelioration, nor was any subsequent improvement in motility of the limb noticed. In the case described, however, the limbs regained motility and the ossification diminished, and even in one place disappeared. The pathogenesis of this ossification is obscure, but seems to depend on the failure of certain nerve fibres to function. The present case showed that they were not concerned in the sensory or pyramidal tracts, since these were not affected. A second case is described in which the left arm and leg were similarly affected. The course of this case was remarkable in that the distal joints recovered before the proximal, in contra-distinction to what obtains in pyramidal tract lesions. A third case is described illustrating the difficulties of diagnosis between cerebral embolus and encephalitis. A comparison of the epidemiology of encephalitis and poliomyelitis concludes a valuable contribution.

R. G. GORDON.

- [122] Postencephalitic Parkinsonian syndrome (Syndrome Parkinsonien post-encéphalitique avec lésions cellulaires nigriques et pallidales sans gainite perivasculaire).—H. CLAUDE and H. SCHLEFFER. *L'Encéphale*, 1923, xviii, 85.

A YOUNG woman of twenty-one had a slight attack of encephalitis lethargica in February, 1920, which left her somewhat dull and stiff, but otherwise well. In August of the same year, the stiffness became progressively worse, so that by November she lay in a condition of severe Parkinsonian rigidity, with complete absence of spontaneous movement. On November 24, her temperature and pulse began to rise; the next day the pulse was 184 and the temperature 104.4° F.; death occurred on November 26, when the temperature was 106° F. In the absence of any inflammatory lesions in the lungs or viscera the authors attribute this hyperpyrexia to an attack on the medulla oblongata by the virus of encephalitis. The examination of the brain showed depigmentation and disappearance of the cells of the substantia nigra, chromatolysis and disintegration of a certain number of the cells in the globus pallidus, general excess of small cells in the brain tissue and dilatation of vessels, but no perivascular infiltration.

J. G. GREENFIELD.

- [123] Clinical peculiarities of the Tübingen epidemic of poliomyelitis in 1922 (Klinische Besonderheiten der Tübinger Epidemie von Heine-Medinische Krankheit in Jahre 1922).—SCHALL. *Münch. med. Woch.*, 1923, lxx, 763.

IN this epidemic of 139 cases one or two peculiarities are worthy of mention. The first outbreak was in a village several miles from Tübingen. There in the week before the 'day of Assumption' an epidemic of 'influenza' fell upon the infants' school; catarrh of the upper air passages was the chief symptom, and it was so severe that the authorities temporarily closed the school. The teacher had a severe attack of 'catarrh,' became paralysed and died; one

of the pupils died later, also with paralysis. Except for these two cases, the epidemic in that particular school ran the course of one of influenza.

In an institution in Tübingen itself fourteen children suffered from feverish 'colds,' and their temperature charts, all very similar, suggested an ordinary slight influenza epidemic. But in three of these cases paralyses appeared.

The experiences in these two schools raise the question of the frequency of abortive attacks of the infection which is responsible for acute anterior poliomyelitis. In the school in Tübingen the non-paralytic cases were much commoner than the paralytic in the proportion of 11:3; Schall states that Brosström, in 1919, found the proportion to be 16:1, but until we are able to identify cases of the non-paralytic type of the infection such statistics must be very few and not above suspicion.

J. P. M.

- [124] Erb's syphilitic spinal paralysis (Zur Kenntnis der syphilitischen Spinalparalyse (Erb)).—EMIL REDLICH. *Monats. f. Psychiat. u. Neurol.*, 1923, liv, 93.

REDLICH reports a case of so-called Erb's syphilitic spinal paralysis, but calls in question the specific nature of the disease. Though both clinically and histologically the findings in the case reported (a male, aged sixty-one) correspond closely with the description given by Erb, in 1892, Redlich considers that the directly syphilitic nature of the lesion is unproven and prefers to attribute it to an ordinary arteriosclerosis affecting the cord as a whole. The patient, it is true, had acquired syphilis at the age of eighteen, but from that time until the onset of typical symptoms about six years before his death he had led an apparently healthy life. Possibly the arteriosclerosis may have been induced by a slowly acting syphilitic toxin; yet we are very much in the dark about the working of such a toxin, and there may be many other toxins capable of producing similar effects. In any event, the morbid process, whatever its nature, affects many spinal tracts and is neither a focal degeneration nor a system disease.

Taking all the evidence into consideration, Redlich comes to the conclusion that Erb's syphilitic spinal paralysis is not a so-called clinical entity but a group of symptoms which reveal a particular stage of a chronic and diffuse spinal degeneration.

ALFRED CARVER.

- [125] Tumours of the upper cervical cord.—I. ABRAHAMSON and M. GROSSMAN. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 342.

"A SPINAL cord tumour is a foreign body in an extensible bony canal compressing the adjacent structures which that canal contains in the order of their compressibility." The authors describe how the growth gradually presses on and displaces the cord, first affecting its blood and lymph supply, and this alone may induce many clinical symptoms. They point out how localized compression may dam up cerebrospinal fluid above the tumour, and this may cause pressure which will mislead observers into diagnosing the tumour as being situated two or three segments higher than it really is

They lay stress on the fact that no one symptom is specific of any tumour, and especially of cervical tumours: consideration should rather be given to the composite picture. Paralysis may be flaccid or spastic: rigidities, spasms and weakness of cervical muscles should always be observed with the possibility of spinal tumour in mind. Root pains may occur, and paralysis of the diaphragm is often important. Organic reflex trouble is an early symptom, and this, together with symptoms referable to the cervical area, should be regarded as significant. Lumbar puncture is stated to be dangerous in these cases, and should only be resorted to with great care. Eight illustrative cases are given.

R. G. GORDON.

- [126] Multiple cranial nerve paralysis: syndrome of the retroparotid space, with special reference to a dual efferent innervation of the facial musculature.—B. STOOKEY. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 529.

THE plexus of the last four cranial nerves and the cervical sympathetic below the parotid gland renders these nerves liable to simultaneous injury by bullet wounds, tumours, glands, or infections. A review of the literature is given in relation to the several functions of these nerves, and the ambiguity as to the limits of respective function of the ninth and tenth is noted. In the two cases fully described no data could be adduced to solve this question, since both nerves were affected. The author is, however, satisfied that the vagus is not a purely sensory nerve, as Vernet suggests. The observation which is important is that the tone of the facial muscles was impaired though voluntary control was intact. This, in relation to certain cases of facial paralysis in which voluntary control is lost but tone is little affected, suggests a dual innervation of the facial musculature. The author thinks that the tonic status of the muscles depends on the cervical sympathetic, while voluntary movement depends on the seventh nerve.

R. G. GORDON.

- [127] Lumbo-sacral pain and sacralization of the fifth lumbar vertebra, complicated by involvement of the spinal cord.—A. GORDON. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 364.

SACRALIZATION of the fifth lumbar vertebra is one of the less common causes of pain in the lumbo-sacral region. In these cases the transverse apophyses of the vertebra are so enlarged as to resemble the sacral ilia. They may, or may not, be structurally united to the sacrum, but in any case the intervertebral space through which the fifth lumbar nerve emerges is considerably reduced. Clinical symptoms, when present, seem to originate coincidently with the termination of ossification in the enlarged process, which may occur as early as five and a half years or as late as forty-eight years. The chief sign is pain in the back, unilateral or bilateral, according as one or both sides of the vertebra are affected: changes of posture occur, and the lumbar lordosis is lost. Rarely there is an accompanying degenerative change in the spinal cord. A case is quoted in which this occurred apparently as a sequela of the radicular involvement.

R. G. GORDON.

- [128] **Symptoms referable to the anterior crural nerve in sciatica** (I sintomi del crurale nella sciatica).—F. RIETTI. *Riv. di Patol. nerv. e ment.*, 1923, xxvii, 577.

SYMPTOMS referred to the distribution of this nerve are not commonly described in relation to sciatica, though crural neuralgia is common in toxæmia, appendicitis, etc. Certain authors have insisted on the frequency of radicular lesions in sciatica, and have pointed out that such radiculitis often affects the lumbar segments giving origin to the crural nerve. In such cases there is pain in its distribution, wasting of the quadriceps extensor, and sometimes interference with the patellar reflex. Golombek found the latter abolished in 46 per cent. of cases of sciatica. The author was able to find symptoms referable to the anterior crural nerve in thirty-nine cases out of fifty of true sciatic neuritis. These take the form of pain in the distribution of the crural saphenous nerves with tender points in the groin, inner side of knee, internal malleolus and big toe, of muscular wasting of the quadriceps and sometimes abolition of the knee-jerk. After some discussion as to the exact location of the morbid process in sciatica, the author gives his view, that there is an inflammatory process which attacks that part of the nerve which lies between the meninges and the plexus.

R. G. GORDON.

- [129] **Sensory dissociation in peripheral nerve injuries**.—J. BYRNE. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 209.

THE author accepts the principle of dissociated sensibility and differentiates an affective and a critical function in sensation subserved by different nerve fibres. When the affective function returns first in regeneration the dissociation is protopathic in type, while when the critical function returns first the dissociation is epieritic. One case of each type is described, and from these he concludes that:—

1. The occurrence of protopathic and critical dissociation after peripheral nerve injuries points to the existence of two fundamental independent anatomical systems of nerve fibres for the mediation of the basic critical and affective forms of sensibility.

2. The critical and affective systems have intimate functional relations, each system functioning in a general way as the antagonist of the other.

3. Within certain limits of stimulation each system may partially inhibit the other so that elements from each may fuse, or enter consciousness simultaneously, forming the basis of our ordinary composite sensations, such as pricking, heat, cold, etc.

4. The fundamental critical system is further differentiated into independent sets or sub-systems of fibres for the mediation of the specific elements, warmth, cold, etc.

5. The affective system does not become differentiated otherwise than as it functions side by side with the critical system, supplying the affective element in our ordinary composite sensations.

6. 'Protopathic' heat and cold as primary forms of sensibility have no existence in fact.

7. Spatial discrimination as tested by the simultaneous application of the compass points is not a primary form of sensibility.

8. The so-called 'epieritie ranges' for heat (warmth) and cold, considered as primary independent forms of sensibility, have no existence in fact. They are merely an arbitrary division of the general range, which for each of the critical elements, warmth and cold, is a natural *continuum*.

9. The radial nerve mediates deep critical and affective forms for portions of the fingers and dorsum of the hand.

10. Normal and newly regenerating primary sensory neurones of the affective system, when injured or overstimulated, continue to hyperfunction for some time after the stimulus has been withdrawn.

11. Newly regenerating primary affective neurones exhibit a marked tendency to function according to the 'all or nothing' principle.

12. Over-reaction is, in part, the result of release of the affective mechanisms, with their inherent 'all or nothing' tendency, from the inhibitory influence of the critical mechanisms.

13. Neither system, as low in the scale as the batrachians, seems to be prior to the other in point of time or development.

14. In deep sensibility the critical and affective elements are mediated by separate anatomical systems which have functional interrelations like those found in the superficial critical and affective systems.

15. The 'co-operation of antagonism,' under which the critical and affective systems function, furnishes not only the basis of cognitive methods of adjustment to environmental changes and of ordered sensation and psychic development, but is the basic point of ordered functioning in neural mechanisms, from the simplest reflex to the most complex mental reaction.

R. G. GORDON.

[130] **Late distal myopathy** (Les myopathies distales tardives).—NAVILLE, CHRISTIN and FROMMEL. *L'Encéphale*, 1923, xviii, 182.

IN a useful review the authors add five personal cases to those already recorded, and believe that distal myopathy in the female has characters of its own. Thus they stress its appearance at a later age than in the male, five out of eight cases having developed after the age of forty, its slow evolution, its incidence on the peripheral extensors of the limb. In the case of male distal myopathy, the age of onset is notably earlier, ten out of thirteen cases having developed before the age of thirty; the small muscles of the distal segments are affected somewhat rapidly, and the symptoms generally seem a compound of a myopathy and a myelopathy. The hereditary element in distal cases is conspicuous by its absence, both in male and female examples; the latter, according to the authors, show as a rule purer instances of true distal myopathy than the other sex, in which the course of the disease does not always follow a 'march' from periphery centralwards. There is a good bibliography.

S. A. K. W.

PROGNOSIS AND TREATMENT.

- [131] Spinal drainage following intravenous arsphenamine. —CRAIG and CHANEY. *Jour. Nerv. Ment. Dis.*, 1923, lvi, 97.

DESCRIPTIONS are given of the rationale and procedure and thirteen cases are described. Improvement can only be looked for when disordered function is due to perivascular exudate: once degeneration of nervous tissue has taken place, nothing can be done. The therapeutic test is the only one capable of deciding which condition is responsible. Clinical improvement does not correspond to serological changes and may progress irrespective of the latter. The authors conclude that:—

1. No single method of treatment is applicable to all cases.
2. The intravenous administration of arsphenamine is the method of choice.
3. Spinal drainage after intravenous administration of arsphenamine is not a hazardous procedure.
4. Drainage will benefit some cases which have arrived at a position of inertia under intravenous administration alone.
5. Clinical and serological results may be obtained by intravenous arsphenamine and drainage as satisfactory as are produced by the intraspinal method, and without the severe root-pains frequently set up by the latter.

R. G. GORDON.

- [132] The administration of luminal, with special reference to its toxicity and to intraspinal injection (*Luminaltherapie unter besonderer Berücksichtigung der Giftigkeit und der endolumbalen Anwendung*). —GMELIN. *Münch. med. Woch.*, 1923, lxx, 911.

THE author of this article appears to have had extensive experience in the use of luminal in epilepsy, for since October, 1919, he has used it to the complete exclusion of bromides, in an institution where there are 188 epileptics under care. Yet he has never seen the slightest harmful result from its administration.

He began by giving $\frac{1}{10}$ gm. (1 gr. approx.) of sodium luminal in the day, but now gives about three times that amount; and in these doses, he believes, the drug is not at all toxic.

In twelve cases of quickly recurring seizures he has given luminal intrathecally (2 c.c. of a 5 per cent. solution of sodium luminal) and then toxic symptoms have appeared—elevation of temperature, headache, vomiting, slowing of the pulse, etc. In every case, however, the epileptic attacks have ceased and have remained absent for a considerable period, a result which leads the author to hope that a new field for luminal therapy may be opened up.

J. P. M.

- [133] The treatment of Sydenham's chorea by passive congestion (*Die Behandlung der Chorea minor mit Stauungshyperämie*). —ESAU. *Münch. med. Woch.*, 1923, lxx, 810.

IN his writings on the effects and therapeutic uses of passive congestion, Bier advocated its employment in cases of epilepsy and of chorea. Dr. Esau

in this paper gives an account of the treatment of cases of Sydenham's chorea exclusively by this means. He applied an elastic band, arranged so that it could be tightened as occasion required, round the neck of the patient, at first only for two hours a day, and then for progressively longer periods, up to a maximum of twenty-two hours in the day. Two of the cases were first attacks, the other four were recurrences, and all were severe. In every case the patient made a rapid improvement and was completely well within four weeks, a course which, in some of the recurrent cases, contrasted strongly with the lingering progress of previous attacks. It was found advisable to continue the use of the band for a time after all signs of chorea had disappeared, relapses being otherwise liable to occur. The author states that he was so well pleased with these results that he now treats all cases of chorea in this manner.

J. P. M.

Endocrinology.

[134] The diagnostic value of vegetative disturbances in diseases of the nervous system.—E. A. SPIEGEL. *Jour. Nerv. Ment. Dis.*, 1922, lv, 466.

IN the study of lesions affecting the vegetative nervous system it must be remembered that there are constant relays of neurons in this system and that lower levels are capable of taking on the function of higher levels. High lesions of the central nervous system produce no more than transitory interference with the functions of the vegetative system: it is in spinal lesions that permanent affections of this system are met with, especially from the third sacral segment downward, where special sympathetic cells replace the usual anterior horn cells. These have to do with the innervation of hollow organs in the pelvis, but any one organ is innervated by cells belonging to more than one segment. Only in sacral lesions are the purely spinal bladder and rectal reflexes completely lost; with lesions at a higher level are found the automatic bladder and the presence of reflex closure of the sphincter on touching the anal mucous membrane.

The reflexes of uterine contracture and erection of the penis seem to be served by a peripheral arc quite outside the spinal cord, but ejaculation is a cord reflex. Dissociated disturbance of potency (interference with ejaculation and orgasm with retention of erection and libido) is diagnostic of lower sacral lesions only if it persists from the beginning.

The sensory nerves from bladder and rectum enter the cord higher than the level at which the corresponding motor nerves leave it, hence retention of the sensation of fullness with loss of motor activity may be of diagnostic value.

In other regions of the cord, less help is obtained from observations on interference with vegetative function. The ciliospinal sympathetic reflex has its cell station in the lateral horn in the transition between the cervical and dorsal segments. The same or neighbouring groups of cells arranged round the central canal in the dorsal segments apparently control the innervation of sweat glands and blood vessels. Recent observations have not confirmed Schlesinger's contention that the nerves to the sweat glands accompany the

sensory nerves, so furnishing diagnostic evidence of the segment involved. In transverse lesions of the cord sometimes hyperhidrosis and sometimes anhidrosis are present in the affected area. The innervation of the blood vessels may be more useful for localization, and in those cases in which reflex dermatographia can be generally induced its absence in one segment is of diagnostic value.

Horner's syndrome—myosis, ptosis and enophthalmos—points to a lesion of the ciliospinal centre at the level of C8—D1.

The centre for the efferent fibres to the intestinal tract is in the dorsal nucleus of the vagus in its posterior part, and that to the lungs in its anterior part, but the inhibitory centre for the heart is still uncertain, and beyond the fact that bradycardia, Cheyne-Stokes and Adam-Stokes syndromes are associated with lesions of the floor of the fourth ventricle nothing definite can be stated. Lesions of the dorsal vagus nucleus will produce glycosuria.

Lesions of the formatio reticularis cause homolateral sympathetic ophthalmoplegia and contralateral sweat gland and vasomotor disturbances in the extremities, which may be quite independent of motor lesions. The centres for the salivary glands are in the formatio reticularis of the pons, cells at the level of the seventh nucleus being concerned with the submaxillary gland and cells caudal to this with the parotid.

In the midbrain the pupillary reflex is the diagnostic indication, though results as to the position of the cell stations of the pupillary fibres are conflicting. No certainty can be attached to the statement that the abolition of reflex dilatation of the pupil to pain points to a lesion of the corpus subthalamicum. It is uncertain whether diabetes is due to a lesion of the hypophysis or of the midbrain. The vegetative functions associated with the basal ganglia are still obscure, and various contradictory results and views are described. In the cortex there seem to be centres for the retention and discharge of urine, located in the region of the cortical representation of the spinal segments corresponding to the hypogastric and pelvic nerves respectively.

Localized symptoms of interference with vegetative function have been observed in Jacksonian fits and these may be useful in locating the lesion. The effects of cortical lesions on pupillary reaction are still too vague to be of practical use.

R. G. GORDON.

[135] *Organo therapy in sexual impotence.*—VICTOR G. VECKI. *Jour. of Sex. and Psychoanalysis*, 1923, i, 128.

NOTWITHSTANDING the meagreness of our endocrinological knowledge, this writer believes that we are more than justified in employing organotherapy in many cases of hypogonadism. While we formerly blamed 'nervous heredity,' we now frequently must speak of 'glandular heredity.' Recently he has given small doses of prostate (grain 1) with other glandular preparations to impotent patients with beneficial effects. Practical experience, he thinks, proves that the internal, the hypodermatic and the intravenous use of orchitic preparations is very effective also. Considering how the various endocrine glands function together, he cannot see that anything can be accomplished without

pluriglandular organotherapy. Since most impotent persons, mainly elderly, are also anæmic, he advises the addition of three to five grains of hæmoglobin. Each case, however, must be studied individually. The author has also seen good effects upon the sexual power follow the injection of ram's semisolid testicular substance, and also from ligation and severing of one or both vasa deferentia.

C. S. R.

- [136] The effect of intravenous injection of calcium in a case of tetany (Untersuchungen über die Wirkung der intravenösen Calciumtherapie bei einem Fall von Tetanie).—LEICHER. *Deut. Zeit. f. Nervenhe.*, 1922, lxxv, 296.

THE case here reported is that of a young man of eighteen, who for three weeks before admission to hospital had been subject to spasms in the hands and feet; when he was examined the phenomena of Trousseau and Chvostek were both present, and the muscles were hyperexcitable to electrical stimuli (Erb's sign). The calcium content (total) of the blood serum was found to be 5.9 mg. per cent. (Normal value for patient of same age, 11 to 12 mg. per cent. (Leicher.)).

The patient was given by intravenous injection 10 c.c. of a preparation of calcium-chloride-urea (Afenil). Within fifteen minutes of the injection Trousseau's and Chvostek's signs were no longer obtainable, and the strength of current required to cause muscular contraction was almost doubled; a sample of blood taken thirty minutes after the injection showed a calcium content of 7.1 mg. per cent. During the next ten hours the patient was well, and no signs of tetany could be elicited; then Chvostek's sign alone reappeared.

Three days later the patient had a typical severe attack of tetany and received an injection of Afenil during the attack; the spasms relaxed at once and the twitchings abated. Since then two injections of Afenil have been given each week, and the patient has had no further attacks.

It seems from this case that the intravenous injection of calcium may give immediate relief in attacks of tetany, and that its effect persists for a period sufficient to keep the patient free from attacks until calcium given by the mouth has had time to act.

J. P. M.

Psychopathology.

PSYCHOLOGY.

- [137] The dream of frustrated effort.—J. C. GREGORY. *Psyche*, 1923, iv, 24. THE depletion of the dreaming mind by sleep is reflected in a disturbance of the sense of reality. Bodily sensations are important contributions to our sense of reality. It is possible that moments of purely mental activity may cause a sense of unreality by depleting consciousness of the marginal mass of sensation. This occurs in the dream and disturbs the dreamer's sense of reality.

The dreamer experiences a sense of unreality when he seems to move but does not feel his movements because they do not really occur. In dreams of frustrated effort there is conflict between affirmation and denial, which results in the conviction that attempts are failures. In these dreams the failures are often concerned with characteristics of waking life in which the dreamer is expert. In the train-missing dream there is a belief in effort and failure. The disturbed sense of reality, although insufficient to convince of unreality, expresses it through the absence of sensations of movement. When the dreamer realizes he is dreaming it may denote a victory for the assurance of unreality. The train-catching dreamer seems to race for the train but feels that he does not move; he compromises by supposing that he is trying and failing. From this it is deduced that sleep experiments on the mind by partially cutting it off from the world. In the recurring dream the memory of the former dream may help the dreamer to decide that the later dream is unreal. The dream of frustrated effort is intermediate between a thinned reality dream and one recognised as such. Inability to move is probably the direct rendering of the dreamer's actual lack of movement. The author thinks that a missed-train dream may express consolation against fear of death, as Freud suggests, without prejudicing his explanation.

ROBERT M. RIGGALL.

- [138] A contribution to racial psychiatry (Ein Beitrag zur Rassenpsychiatrie). —A. GANS. *Münch. med. Woch.*, 1922, lxx, 1503.

This is an interesting observation made from a study of the Javanese.

Notwithstanding the immense difference between the psychology of the Javanese and that of the European, so great indeed that any real understanding of the personality of the Javanese is almost impossible for us, the psychotic phenomena are nevertheless identical in the two races. The author concludes from this that in spite of the greatest differences between members of widely distinct races, the essence of their human nature is the same. That is to say, heterogeneity and differentiation are found in the conscious psyche, whereas the collective unconscious is uniform.

H. G. BAYNES.

- [139] Phenomenology (Über Phänomenologie). —LUDWIG BINSWANGER. *Zeit. f. d. g. Neur. u. Psychiat.*, 1923, lxxxii, 10.

This paper raises a number of profoundly controversial metaphysical questions with which it is impossible to deal in a brief abstract. It is nothing short of a bold attempt to distinguish two kinds of reality: the sensuous, concrete and particular perceptions belonging to the realm of natural science, and the phenomena or the kinds and forms of consciousness which appear as immediate intuitions corresponding to specific essences of things. The first consist in frank sense perception, whereas the second, although derived from sense perception, is really associative perception. It is generic and essential as opposed to individual and actual. The writer also attempts to define a phenomenological method by which this particular intuitive capacity can be developed. It seems that he is really discussing the antithesis between the function of sensation and intuition, but he raises so many other issues in his numerous

examples from art and literature, that it is not easy to grasp whether at bottom the problem which interested him is psychological or philosophical.

H. G. BAYNES.

PSYCHOSES.

[140] On the pathology of senile psychoses.—S. UYEMATSU. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 1, 131, & 237.

In an introduction the author reviews the opinions of authorities on the varieties of senile psychoses and the significance of Redlich-Fischer's miliary plaques. On the latter point it is clear that considerable confusion obtains. The nature and origin of these plaques is obscure, and the opinions expressed in the literature quoted convey no more definite conclusion than that they represent a degenerative process in the central nervous system. The author describes his histological investigations and differentiates four types of plaque: the spheric form with nuclear-like central mass, the diffuse form with nuclear-like central mass, the perivascular form, and the diffuse spheric form with globule-like contents. Topographically plaques seem most frequent in the frontal lobes and the hippocampal gyri: in a few cases they are seen in cerebellum and basal ganglia. None is found in the spinal cord. They are mostly to be seen in the grey matter of the cortex, or in the white matter usually near the former. The author considers the plaques originate from an abnormal reaction of the glial reticulum, due either to exhaustion of nutritive energy or to specific exogenous agencies.

One hundred cases of senile psychoses are studied and divided into six groups, according to the pathological findings post-mortem:—

1. Cases in which miliary plaques are the prominent feature (forty-seven cases described). Of these all but two showed clinical symptoms of senile dementia.

2. Cases in which plaques are found together with arteriosclerotic dementia (seventeen cases described). Clinically some of these cases appeared to be senile dementia, while others were arteriosclerotic dementia.

3. Cases in which arteriosclerotic changes are main features (twenty-six cases described). These cases were, on the whole, typical of arteriosclerotic changes.

4. Cases showing marked parenchymatous degeneration without plaques or arteriosclerotic changes (two cases described). Clinically they corresponded with senile dementia but presented some peculiarity in the previous history, which made the diagnosis of senile dementia uncertain.

5. Cases of minor parenchymatous degeneration (four cases described). These consisted of one epileptic, two cases of involution melancholia, and one of alcoholic deterioration.

6. Organic lesions of other nature (three cases described). One of these was a case of gas poisoning, one of epithelioma, and the other of general paralysis.

In the author's opinion the absence of plaques rules out a diagnosis of senile dementia, and although their presence is not absolutely diagnostic, it is highly suggestive. The number of the plaques does not correspond with the

severity or the type of clinical symptoms. The latter factor would seem rather to depend on the disposition of the patient. Arteriosclerosis does not seem to have any causative connection with plaques, but may occur coincidentally with them. The clinical differentiation between senile and arteriosclerotic dementia is discussed: the former is progressive, while in the latter remissions occur, the clearing up of periodic confusion being in favour of this diagnosis. Insight is fair in the early stages of arteriosclerotic dementia but not in senile dementia. In senile cases impairment of retention is marked and leads to delusions and general impairment of memory. Savage's 'denudation' is always marked. Defect of recent memory is often made good by extensive fabrication. Nocturnal restlessness and wandering are frequent in senile cases. In arteriosclerotic dementias emotional incontinence is marked, while melancholic and hypochondriacal ideas, sometimes leading to suicide, are frequent. In the senile cases the emotion is much more superficial and transitory, and hallucinations are more frequent. Focal symptoms are much more common in arteriosclerotic cases.

R. G. GORDON.

- [141] On the relation between tuberculosis, polyneuritic psychoses and delinquency (*Sui rapporti fra tubercolosi, neuro-psicopatie e delinquenza*).—R. COLELLA. *Riv. di Patol. nerv. e ment.*, 1922, xxvii, 8.

THE author's cases are taken from the asylums and neuropsychiatric clinics attached to the University of Messina and Palermo.

The clinical details are given in five cases which show neuritic and psychic changes associated with tubercular infection. In such cases there would always seem to be a neuropathic or psychopathic inheritance which probably allowed the tubercle bacillus to affect the tissues of the central nervous system. This effect is produced, not by the bacillus itself, but by the toxins derived from it. The symptoms show involvement of the peripheral nerves with or without accompanying involvement of the higher centres. The symptoms of the latter may simulate G.P.I., manic depressive insanity, or simple dementia. Impairment of memory and loss of association of ideas are the most characteristic phenomena, though all sorts of other mental phenomena may be met with. Amongst these are alterations of character leading to delinquency. Several murders committed by tubercular subjects are quoted, and the frequency of sexual aberrations in these subjects is pointed out. Crimes of violence against his own person or against others are commonest, and then sexual delinquencies. Crimes against property are rare. The author points out that the notorious Landru was in the last stages of tuberculosis. He considers that patients with definite tubercular psychoses or polyneuritic psychoses should be segregated at once.

R. G. GORDON.

- [142] The mental concomitants of diabetes mellitus.—CLEMENT B. MASSON. *New York Med. Jour.*, 1923, cxvii, 598.

IN diabetes mellitus we may have, aside from a definite psychosis, less organized and less malignant psychic troubles. Among the exogenic psychic disturbances we note intellectual laziness, diminution of memory, hypochondriac

occupations, hypoaffectivity with egocentric tendencies, and diminution of moral and physical energies. A depressed state of mind and a sense of ruin and worthlessness are in the foreground in the greater number of diabetics having an associated psychosis. Three factors play an important rôle in the development of a psychosis associated with diabetes, viz., arteriosclerosis, the involutional period and heredity. Arteriosclerosis may be the causative factor of the patient's abnormal mental reactions. Again, diabetes has a tendency to cause arteriosclerosis, in which case it would be a remote factor in the psychotic development, or the two may aid one another. The initiating factor in diabetes may be part of an internal secretory syndrome, and at the involutional period there is a change in the biochemical regulating system. Adding poor heredity to a case of diabetes mellitus we have a strong psychic determinant in itself. When one or more of the foregoing factors are present, the psychosis cannot be said to be symptomatic of diabetes. It has been the observation of several clinicians that the mental symptoms in cases associated with diabetes cleared with the gradual disappearance of the urinary abnormality. However, before definite mental symptoms can be directly attributed to that form of brain intoxication accompanying diabetes, further study of selected cases with the free use of blood chemistry will be necessary.

C. S. R.

- [143] **Monosymptomatic melancholia** (Monosymptomatische Melancholie).—
HANS SCHMITZ. *Münch. med. Woch.*, 1923, lxx, 393.

THE author quotes a group of cases which he brings together under the heading of 'monosymptomatic melancholia.' They are all cases in which the underlying melancholia was marked by some organic disorder localized in the stomach or the sex function. He maintains that on account of this apparent localization in grosser systems the real psychological condition was overlooked. The diagnostic attitude accountable for such blindness as this will presumably survive just as long as the physiological standpoint is allowed to ignore obvious psychological facts.

H. G. BAYNES.

- [144] **A review of service patients in a mental hospital.**—D. K. HENDERSON
and R. D. GILLESPIE. *Amer. Jour. Psychiat.*, 1923, iii, 13.

THIS paper analyses 113 'service' cases of the more chronic type. Its purpose is to examine more particularly their etiology, symptomatology and prognosis, with a view to augmenting the slender volume of collected data on the subject. The existing literature is summarized and criticized. It is shown that the proportions of the various disease types among service patients has altered since the war period, and that dementia præcox cases constitute with mental defectives by far the greater proportion of cases still under care. Of the etiological factors, insane heredity, psychopathic predisposition, previous mental illness, constitutional inferiority, and excessive alcoholism together accounted for 99 per cent. of cases. These factors, however, were found to be combined in many cases with physical inferiority or ductless gland anomalies. This latter was noted more particularly in the dementia præcox cases. The average length of service of those who only

served at home was ten months ; while of those who also served abroad it was 2·2 years. A comparison of toxic-infective factors with the resulting psychosis shows that varied factors of this type yield a comparatively small number of disease pictures, and these much more commonly are well-defined psychoses than the simple infective-exhaustive type. An examination of the symptomatology shows that no new type of mental disturbance has been produced by the war, but that certain psychoses (viz., dementia præcox), which in civil life are usually chronically progressive, appeared in an acute recoverable form. More than half of the cases now resident in hospital are of the dementia præcox kind, and of these most are of the paranoid variety. A detailed analysis of the mental status of the dementia præcox cases revealed in nearly all of them a considerable, and sometimes profound, degree of dementia. The prognostic inference is obvious. The inefficiency and lack of endurance of the constitutionally inferior (mental defective) group is demonstrated. On the other hand, nearly half of the general paralytics had an average length service practically equal to that of the whole series. Finally, it is evident that the majority of the cases under consideration would eventually have entered mental hospitals even without the superaddition of war-strain ; and that of those remaining under care, none are likely to reach a normal standard of mental health, and nearly all will have to reside permanently in an institution.

C. S. R.

[145] **Dysthymic children** (Les enfants dysthymiques).—SANTE DE SANCTIS. *L'Encéphale*, 1923, xviii, 1.

CHRONIC constitutional dysthymia (depression or excitement) is very common in children. Among the constitutional dysthymies are to be found a large number of antisocial individuals.

Chronic hypothyrmic children are dreamers, idle, seclusive. They live on sensations. They are prone to be overcome in thunderstorms, on hot and tiring days, during religious ceremonies, in the face of the duties of school, etc. Among them, further, are to be found many child suicides, disposed to renounce life for trivial reasons, such as reproaches, criticism at examinations, imagined offences. Yet they are not pessimists in the ordinary sense.

The constitutional hyperthyrmies are excitable to a degree : from them are recruited on the female side the youthful prostitute, and on the male the youthful criminal. A love for excitement, romance, adventure, characterizes their affective life.

Mixed or dysthymic cases occur with some frequency. Professor de Sanctis analyses his material with remarkable acuteness, and in his opening paragraphs clearly distinguishes these cases from the manic-depressive psychosis of Kraepelin, a conception which he subjects to considerable criticism.

S. A. K. W.

[146] **The difficult and delinquent child**.—R. G. GORDON. *Psyche*, 1923, iii, 291.

IN considering the problem of the delinquent child, Dr. Gordon urges greater co-operation in the fields of education and psychology. He deplores the

tendency to restrict the range of inquiry within the limits of any one creed or dogma, and emphasizes the importance of a broad outlook.

The types most likely to give trouble are the psychopathic and retarded children not sufficiently feeble-minded to come within the scope of the Mental Deficiency Act. Unmodified and uncontrolled dispositions will lead to vicious conduct, but if modified by education are capable of leading to the highest virtues. An adjusted balance between these factors is required. Lack of balance manifests itself in varying degrees between the different impulses and the environment. In those cases in which there is failure of adaptation to the environment there is no distinction between phantasy and reality. The most difficult cases show an over-mastering uncontrolled impulse, such as the instinct of acquisition. Lack of affection for others may be due to a deficiency of the gregarious instinct. Improvement of integration factors already present is a much more hopeful outlook than the supplying of an absent structure *de novo*. In dealing with the case of the retarded child, the author emphasizes the danger in the establishment of feelings of inferiority. Should self-assertion be a prominent feature the child will not submit, but will react strongly to the idea of inferiority, exhibiting the will to power. His disobedience and stubbornness may result in pathological lying. Expression of his inferiority may show itself in phantastic adventures such as truancy and wanderings, often supplemented by theft. Later, this sense of inferiority may express itself in neurosis, drink, or drugs and criminality. The investigation and treatment of these cases should be definitely undertaken for the sakes of the individual and the State. This investigation should be carried out under three headings: (1) physical examination; (2) the intelligence should be investigated by means of the Stanford revision of the Binet-Simon or the Yerkes-Bridges point scale tests; (3) the reactions to life must be undertaken by mental exploration. Psychotherapeutic clinics should be organized, the functions of which should at first be purely advisory. The need for the proper selection of thoroughly qualified workers in these clinics is strongly advocated.

ROBERT M. RIGGALL.

- [147] The relations between mental disorders and infectious diseases (Über die Beziehungen zwischen Geistesstörungen und Infektionskrankheiten).—M. ROSENFELD. *Munch. med. Woch.*, 1923, lxx, 415.

In this paper Rosenfeld discusses the relation, if any, between mental diseases and infectious disorders. From numerous sources he quotes evidence which, although demonstrating the profound influence acute toxic conditions can have upon a psychotic state, is none the less entirely ambiguous as to the nature and tendency of this influence. The attempts to induce artificial febrile states by malaria and other toxic agencies are in his view not justified by the results. His scepticism even goes so far as to say that the superadded toxin of the fever often seriously aggravates the psychotic phenomena.

H. G. BAYNES.

- [148] The sexual offender. A contribution to the study of the psychogenesis of sexual crimes.—BEN KARPMAN. *Psychoanalytic Rev.*, 1923, x, 270.

THE conception that criminality no less than insanity is an expression of a diseased personality at the psychological level has been very slow of recogni-

tion. Still more difficult of appreciation has been the conception recently brought forth that in many instances the criminal act instead of being wilfully intentioned is in itself motivated by deeply seated unconscious conflicts of the individual criminal. Cases here reported at some length deal with such individuals, and the writer endeavours to show that their antisocial acts were but the culmination of lifelong difficulties which drove them with the force of an instinct to commit the particular type of crime. He finally concludes that "individuals arrested on the charge of writing and sending obscene letters by post, can often be shown to be homosexuals, whose antisocial activities are psychogenically motivated by unconscious conflicts, and that they should, therefore, be treated as mentally ill and not as criminals."

C. S. R.

[149] **Suicide and sexuality.**—MAX MARCUSE. *Jour. of Sex. and Psychoanalysis*, 1923, i, 180.

THE extraordinarily large number of suicides committed during the period of puberty, and the numerous suicides and double-suicides on account of confessed or otherwise evident unrequited love, are suggestive of a connection between suicide and sexuality. Sexual troubles at puberty are often the root of the suicides of school children, and there seems to be an unquestionable connection between such and masturbation. Eulenburg states that the disturbances caused by puberty itself are greater in girls than in boys, and furthermore, the emotional effects of sexual and erotic motives exercise a more intensive influence upon girls than boys. Thus the immediate motives, such as unrequited love, jealousy, 'the results of an affair,' etc., were recorded in 14.6 per cent. of youthful male suicides, and 40 per cent. of females. The erotic motives are most patent in double-suicides, the more active party being almost regularly the woman. As a rule, the man kills the woman with her consent and then himself. Hundreds of alleged suicides committed by women are in reality not suicides at all, but are accidents in attempts to obliterate evidence of bodily guilt. The inner tension involved may be turned towards another person, so that instead of suicide we may have murder. It seems probable that syphilis as a motive is quite considerable. Two groups may here be distinguished: (1) Those in which from a normal psychological standpoint the act is quite comprehensible, though prompted by a wrong and exaggerated idea regarding the dangerousness of the disease, and (2) those in which suicide is devoid of any rational foundation and only the expression of a morbid compulsory idea. Hirschfeld estimates the incidence of suicides owing to homosexuality as about 3 per cent. of all urgings. The true love suicides represent a group of their own, and are more frequent amongst homosexual than among normal individuals. Among juvenile female suicides menstruating girls are in the majority; and the suicides of pregnant women and those committed during the climacterium are of considerable significance. In men, impotence may be important causally. In the family status of suicides it has been noted that the proportion of married men is greater than that of bachelors. Regarding women, the reverse obtains. Suicides are frequent among widowed and divorced men and women. Three times more childless

women commit suicide than mothers. The incidence of suicide runs parallel with that of sexual crimes, and both are manifestations of a 'sex periodicity.' The methods employed also help to throw light on the relation of suicide and sex.

C. S. R.

NEUROSES AND PSYCHONEUROSES.

- [150] Traumatic neurasthenia in insured persons (À propos de la "névrose des assurés").—C. JUILLARD. *Rev. med. de la Suisse rom.*, 1923, xliii, 467.

A SWISS Federal Judge, Piccard by name, recently gave advice and counsel to practising medical men concerning the treatment of what we generally term traumatic neurasthenia. The learned judge claimed that the doctor had the chief part to play in preventing and curing functional symptoms, in persons involved in industrial accidents, by a process of suggestion and persuasion.

Dr. Juillard takes a somewhat novel view of the proper course to be followed in such cases. He cites the well-known fact that 'neurasthenic' symptoms following trauma usually clear up when any claim for compensation is finally settled even if no award be made. He points also to the equally well-known fact that such 'functional' subjects generally succeed in getting some award if they are sufficiently persistent. He concludes that the functional results of trauma in insured persons would largely disappear if, at their onset, the medical man could affirm with absolute certainty that no award would result from any proceedings taken. This action on the part of the doctor can only be rendered possible by the whole-hearted support of the law.

G. W. B. JAMES.

- [151] A study of the resistance of red blood cells to the hemolytic action of hypotonic salt solution in psychoneuroses.—B. S. LEVINE. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 231.

THIS investigation shows that the psychoneuroses of the neurasthenic, hysterical, and anxiety types exhibit different group-values for their blood resistance, the anxiety and hysterical groups being more closely related than the neurasthenic type to either. The association of organic conditions seems to intensify this difference. There is a marked difference between dementia præcox and psychopathic inferiority, cases of the former showing an increased resistance of blood cells. The author suggests that these findings indicate an organic structural basis for the different psychoneurotic groups.

R. G. GORDON.

- [152] A survey of routine urinary findings in the psychoneuroses.—B. S. LEVINE. *Jour. Nerv. Ment. Dis.*, 1923, lviii, 207.

THREE hundred and thirty-eight cases were examined and divided into five groups—hysteria, neurasthenia, anxiety neuroses, psychopathic individuals, and organic cases. From these, 827 urinary specimens were taken, and studied from the point of view of specific gravity, colour appearance, reaction, albumin, sugar, indican, bile, casts, cylindroids, pus, mucus, blood cells, sperma-

tozoa. The findings were not conclusive, but certain apparently significant variations in specific gravity were discovered, and a preponderance of spermatozoa in cases of anxiety neurosis was noted. There were definitely more abnormalities in this group of cases than would be expected in a similar group of healthy individuals. The author considers this may point to an organic basis whose study may be useful from the therapeutic standpoint. On the other hand, these changes may be secondary to endocrine imbalance following emotional disturbance, or to organ inferiority such as is described by Adler.

R. G. GORDON.

- [153] **Psychology of hay fever.**—J. PAUL DE RIVER. *New York Med. Jour.*, 1923, cxvii, 730.

In the front rank of the army of psychoneurotics stand the sufferers from hay fever. Hay fever in itself is a true vasomotor neurosis, and its victims are either primarily psychoneurotic or manifest a secondary psychosis following the hay fever attack. There is no condition that the ear, nose and throat specialist encounters in which the nerve element plays such a conspicuous part. In fact, nearly all states of functional insanity are at one time or another experienced by the sufferer, from the irritable and excitable states to the depression of melancholia. Fixed ideas or phobias are but a part of the syndrome. The hypersensitive condition of the nasal mucosa leads to an over-stimulation of the sneezing centre, resulting in this act becoming automatic. Without his will the patient sneezes, due to lack of inhibitory control. Then comes the excess of imagination. He has ideas that in certain localities his condition is provoked. The mere thought or suggestion of his condition stimulates his sneezing centre. In many the act of sneezing has become implanted in the subconscious to such an extent that an attack may be brought on by the slightest thought stimuli. The writer thinks that there should always be a combination of local treatment to give symptomatic relief together with the intelligent use of psychotherapy. Only by recognizing the psyche, which is the directing force, can adequate results be hoped for.

C. S. R.

PSYCHOPATHOLOGY.

- [154] **The metamorphosis of Mary.**—D. A. SIMMONS. *Psychoanalytic Rev.*, 1923, x, 261.

THE writer in his judicial work has applied psycho-analytical principles in the study of divorce cases, and as a result he states that he has brought to light a form of neurosis not hitherto classified. In support of this he cites a case and gives a brief analysis of it. The mechanism of this 'conjugal neurosis' is in many respects the same as the mechanism of paranoia. Each of them springs from a repression in the erotic realm—the one from a repression of homosexuality, and the other from a repression of normal love. In each of them love is transmuted into hate by the argument of the psychic censor, resulting in hallucinations and transferences that are practically the same in both cases. Even hallucinations of persecution and conspiracy are often fully as pronounced in the conjugal neurotic as in the paranoiac. The physical symptoms accompanying the former are in many instances more marked and complex than in the latter. The conjugal neurosis is based upon a repression of

heterosexual love and the difference between it and paranoia is one of degree and not of kind. The repression of any sexual love emotion may lead the censor to defend against a reassertion of the emotion by conjuring up hallucinations of evil doing and malignant design by its object. While the neurosis is nearly always a feminine affliction, men are not totally immune. Laymen have recognised it from time immemorial under the name of 'insane jealousy.'

C. S. R.

[155] The relation of beating-phantasies to a day dream.—ANNA FREUD.
Internat. Jour. of Psychoanalysis, 1923, iv, 89.

ANALYSIS of a case bearing out many of Freud's findings in his paper on 'A child is being beaten' is discussed. When the girl was in her fifth or sixth year she entertained a beating phantasy. Its context changed from 'A boy is being beaten by a grown-up person' to 'Many boys are being beaten by grown-up persons.' The boys, however, as well as the grown-ups, remained indeterminate, and so did the misdeeds for which the chastigation was administered. When the phantasy was called up it was accompanied by strong sexual excitement and terminated in an onanistic act. The little girl for a number of years made ever-failing efforts to retain the phantasy as a source of pleasure and at the same time to break herself of the auto-erotic habit. Later the context of the phantasy fell under the same taboo as the sexual gratification. At about the same time—from her eighth to tenth year—the girl began to entertain new kinds of phantasies, which she herself distinguished by the name of nice stories. The day-dreamer herself was firmly convinced of the mutual independence of the two kinds of phantasies. The only decisive disparity between them lies in the difference of their respective solutions; in one case this consisted of a beating-scene, in the other of a reconciliation-scene. Investigation into the relationship between the two kinds of phantasies revealed: (1) a striking analogy in the construction of the single scenes; (2) a certain parallelism in the context; (3) the possibility of a sudden change over from one side to the other.

The apparent advance from the beating phantasies to the nice stories might be explained as a return to a former phase. The nice stories seem to relinquish the original theme of the phantasy of beating; but they simultaneously bring out their original meaning, i.e., the phantasy of love that was hidden in them. The onanistic act as well as the sense of guilt are both derived from the repressed love-phantasy; the latter, though it is disguised in the phantasies of beating, is represented in the nice stories. At the climax of the nice stories there is no compulsive onanistic act and no sense of guilt. A solution of this problem is furnished by the fact that the nice stories do not take up the whole of the incestuous wish-phantasy belonging to early childhood. Afterwards repression of the Œdipus-complex forced the child to renounce most of these infantile sexual ties; their emergence in the phantasies of beating signifies a partial failure of the attempt at repression. While the phantasies of beating thus represent a return of the repressed, i.e., of the incestuous wish phantasy, the nice stories represent a sublimation of it.

C. W. FORSYTH.

[156] Certain neurotic mechanisms in jealousy, paranoia and homosexuality.

—SIGM. FREUD. *Internat. Jour. of Psychoanalysis*, 1923, iv, 1.

INTENSE jealousy as met with in analytic work is of three types: (1) competitive or normal, (2) projected, and (3) delusional. Normal jealousy is made up of the pain caused by the thought of losing the loved object, and the narcissistic wound, with feelings of enmity against the successful rival, and of a greater or less degree of self-criticism. Even this normal jealousy is rooted deep in the unconscious: it originates in the Œdipus-complex of the first sexual period.

Projected jealousy is derived in both men and women either from their own unfaithfulness in real life, or from impulses towards it which have succumbed to repression. Absolution of his conscience is achieved when he projects his own impulses to infidelity on to his partner. Use is made of the material at hand (perception-material) by which the unconscious impulses of the partner are betrayed. This type of jealousy is amenable to the analytic work of exposing the unconscious phantasies of personal infidelity.

Delusional jealousy also has its origin in repressed impulses towards unfaithfulness: the object, however, in these cases is of the same sex as the subject. It represents a homosexuality, and rightly takes its place among the classical forms of paranoia. The meaning of such delusions of reference is that the paranoiac expects from every stranger something like love. The paranoiac is not far wrong in regarding their indifference as hate in comparison with his claim for love. The enmity which the persecuted paranoiac sees in others is the reflection of his own hostile impulses against them. With the paranoiac the most loved person becomes his persecutor. The ever-present ambivalence of the feelings is the source of this reversal of affect and the unfulfilment of his claim for love strengthens it.

Two cases are cited where analytical investigations were made. Freud notes that classical persecution-ideas may be present without finding belief or acceptance. It is possible that the delusions which we regard as new formations when the disease breaks out have already been long in existence. In some cases a new mechanism leaning to homosexuality was manifest. During early childhood intense feelings of jealousy derived from the mother-complex arose against rivals, usually older brothers. This jealousy led to an aggressive attitude against the brothers (or sisters) which might culminate in actual death wishes. These feelings later yielded to repression and to a transformation, so that the rivals of the earlier period became the first homosexual love-objects. Although it is often combined with typical conditions the new mechanism is a separate one, in that the change takes place at a much earlier period, and the identification with the mother recedes into the background. It represents, too, the exaggeration of the process which leads to the birth of social instincts in the individual. In both processes there is first the presence of jealous hostile feelings which cannot achieve gratification: and in both the personal affection and the social identification-feelings arise as reaction-formations against the repressed aggressive impulses.

C. W. FORSYTH.

- [157] The castration complex in the formation of character. F. ALEXANDER.
Internat. Jour. of Psychoanalysis, 1923, iv, 11.

FERENCZI explains the so-called transitory symptoms which appear under our eye in the course of analytical work as manifestations of resistance against the process of making conscious certain unconscious tendencies which are displeasing to the ego and which have been brought near the level of consciousness by analysis. These tendencies are seeking an outlet in new symptoms and struggling to reach equilibrium by this means. These transitory artificial products make their appearance during the analysis in what are called 'neurotic characters.' The lives of such people display some remarkable irrational features. The neurotic character interweaves his life with the neurosis—his life constitutes the neurosis. The symptoms of illness serve the purpose of localizing those wishes which are in conflict with the conscious ego and thereby preventing them from injuring the rest of life. It is difficult to say whether the damming up of the libido is not great enough to open up new paths and form symptoms as an outlet, or whether the defence-reaction of the organism—the repression—is not powerful enough altogether to exclude satisfaction in reality. The 'neurotic character' contains in it the germ of a particular form of neurosis which must break out if any deprivation, either by external or internal circumstances, ensues of the satisfaction in reality of the neurotic tendency. Analysis removes the previous possibilities of satisfaction by bringing the tendencies incompatible with the ego more and more under the control of the conscious faculties; these tendencies thus escape into those neurotic symptoms which have been hitherto replaced by the actual neurotic satisfaction in life, and in which the tendencies find a fresh subterranean outlet.

The analysis of a case illustrating these points is given. In this patient the symptoms represent a persistent attempt to realize a castration wish. The equivalence of 'money' and 'penis,' with a slighter emphasis on the connecting link 'faeces,' formed the unconscious basis of his impulse-ridden behaviour.

C. W. FORSYTH.

- [158] The analysis of 'dementia' (Zur Zerlegung der 'Demenz').—A. PICK.
Monats. f. Psychiat. u. Neurol., 1923, liv, 3.

PICK reports a case of gradually increasing 'dementia' in a man, aged forty-seven, who had contracted lues twenty-four years prior to the onset of symptoms. Clinical examination revealed a generalized arteriosclerosis in addition to many signs of loss of nervous co-ordination, but the outstanding feature of the case was a disturbance of the higher optic functions. On being tested with the Binet-Robertag pictures the patient could name correctly their several component parts, but failed to find any meaning in them. The day following a test he could recall the component features of any picture but again declared that he did not understand the scene depicted. He thus showed a lack of ability to relate visual perceptions, and in this respect his case resembles those described by Mitchell, Head and Hoppe.

In November, 1916, after gradually becoming more stupid, the patient

died of pulmonary tuberculosis. Autopsy showed, in addition to pulmonary tuberculosis and arteriosclerosis, a tuberculous mass in the right cerebellum and a chronic hydrocephalus of both cerebral hemispheres. From a consideration of this and other reported cases Pick argues that 'dementia' consists precisely in a disturbance of the ability to relate perceptions to one another. In the case cited he favours the idea that the disturbance of the higher visual functions was brought about by syphilitic atheroma rather than by the other lesions discovered post-mortem.

ALFRED CARVER.

- [159] **Psychopathology and general pathology** (Psychopathologie und allgemeine Pathologie).—A. MAEDER. *Zeit. f. d. g. Neur. u. Psychiat.*, 1923, lxxxii, 176.

THIS is an interesting paper on the relation of psychopathology to general pathology. Maeder argues that the natural principle of differentiation in science which has compelled us to view the same object-man from the morphological, physiological, psychological or sociological point of view, is liable to become a danger unless we complement this analytical and intellectual approach by an intuitive and synthetic attitude. He expands his plea with many examples drawn from numerous disciplines and advocates his case for synthetic orientation with considerable eloquence. Naturally, he is aware that it is essentially a question of psychological type and that the analytical approach of natural science springs from the immense prestige of our deductive reason, whereas the intuitive method of association and synthesis can only mature when the irrational function of intuition is given value equivalent to that of reason. He wants us to regard man again as a unity and not as a collection of different categories; and he thinks that the chief obstacle to this attainment springs from our insufficient recognition of the fact that the distinction between subjective and objective, physical and psychical, structural and functional, etc., is not absolute but relative. Many of the parallels that are drawn between pathological and psychopathological states are extremely suggestive, while others do not sustain a too searching scrutiny. The interest of this paper, however, lies not so much in the actual material employed as in the indication it gives of the gradual advance of the synthetic attitude. Everywhere we see the steady permeation of the principle of relativity throughout all our conceptions, of which the recognition and scientific formulation of psychological types is perhaps the most notable example.

H. G. BAYNES.

- [160] **A case of affective inhibition of an intellectual process.**—J. C. FLUGEL. *Internat. Jour. of Psychoanalysis*, 1923, iv, 111.

ANALYSIS showed that the difficulty a student of experimental psychology found over the solution of a simple problem was due to the circumstance that some of the deepest factors of the subject's personality (his castration-complex, inferiority-complex and sadism) had been aroused by the problem presented in the test. The facts in this case bring out four further points of general interest: (1) that performance in mental tests—even when these tests are apparently of a purely intellectual character—*may* be disturbed by emotional

factors : (2) that the presence or absence of such emotional disturbance may depend upon very small differences in the test ; (3) that the emotional factors involved in such disturbance are not necessarily of a general or superficial nature, such as fear of doing badly, but (4) may be related to very deep-lying tendencies, which can only be brought to light by analysis (or some other special procedure).
C. W. FORSYTH.

- [161] **The psychobiologic concept of essential epilepsy.**—L. PIERCE CLARK. *Jour. Nerv. Ment. Dis.*, 1923, lvii, 433.

STRESS is laid on the fact that the fit is only a symptom of a much wider disease process, which eventually leads to dementia. This is not due to gross organic changes, since many cases have been described with marked dementia but no observable changes post-mortem. The author thinks that the morbid change is more intangible and consists of a general failure of character, preventing a proper adaptation to the environment. The rigidity and egocentricity of the epileptic are well known. This character defect is present before fits occur and is not induced by them. Rather the failure of adaptation which is due to unconscious reasons finally induces the patient to break under the strain. The proper treatment of the epileptic is to consider his whole personality ; the fit is but a regressive protective mechanism resorted to by an overstressed organism.
R. G. GORDON.

- [162] **Genius and insanity.**—HUBERT J. NORMAN. *Proc. Roy. Soc. Med. (Sect. Psychiat.)*, 1923, xvi, 33.

MANY authors are quoted to show that for many centuries it has been held that there is a definite correlation between genius and insanity. The writer maintains that genius is the product of a brain in unstable equilibrium. The possessor being more or less of a ' sport ' (from a biological point of view) is not, therefore, one of the best adapted to environment. In many cases this results in his being eliminated by the more stable members of the herd. Genius and insanity are, according to this view, both results of nervous instability. Insanity does not cause genius, but is for the most part inimical to intellectual effort. It may be said with more truth that genius is much more likely to lead to insanity, insanity being the price which Nature exacts in this instance for valuable but delicately constructed gifts. The genius, because of his organization, is an intractable person who is apt to place an undue strain upon his resources and who has to pay the penalty for doing so.
C. W. FORSYTH.

- [163] **Psychoanalysis and vocational guidance.**—WILLIAM A. WHITE. *Psychoanalytic Rev.*, 1923, x, 241.

SUCCESS and happiness in an individual's life will tend to be in direct proportion to the correspondence between his vocations and his desires. Failure and success can perhaps be thought of in terms of the proportion of the personality that is satisfied with the occupation followed. As a result of the lack of satisfaction of the instinctive needs a state of tension is brought about which expresses itself psychologically as a degree of discomfort and which by finding an adequate means of expression is resolved and replaced by a state of equi-

brium, which is psychologically expressed by a feeling of satisfaction. Disequilibrium seems essential to action, and perhaps the strength of the affective force and the vocational success is in proportion to the degree of disequilibrium. After Stekel, the author considers vocational choice in five distinct mechanistic groupings. (1) Identification with the father: (a) The relation is direct, as in choosing the same vocation; (b) the relation is indirect as regards the choice—the son of a butcher becomes an anatomist; (c) the relation is indirect as regards the father—father surrogate followed, such as student imitating a teacher. (2) Differentiation from the father: The tendency here is to make a selection the exact opposite of the father's, or father's surrogate. (3) The sublimations: (a) The sadomasochistic tendencies. Sadism may lead to the vocation of butcher or surgeon, or may gain an outlet in prize-fighting, hunting, etc. The masochistic component may lead to humble occupations, playing 'second fiddle'; (b) exhibitionism, as seen in the actor, occupation involving uniform, secret societies, athletes; (c) curiosity, impulse to experiment and investigate, research work; (d) anal-erotism, the tendency toward orderly occupations, book-keeping, librarian. Those interested in financial affairs, collectors. Sublimation may result in interest in cooking, building, sculpture, etc. (4) Protection against unconscious tendencies. Religious or legal careers as protection from criminal impulses. (5) Expression of unconscious sexual tendencies: (a) Homosexuality masseurs, bathing attendants, waiters; (b) anal-erotism, street cleaners; (c) fetishism, foot fetishists may become shoemakers, hand fetishists may become glove makers.

The psychoanalytic point of view may be summed up in the formulation of Freud, viz., that the permanent distinguishing traits of a person are either unchanged continuations of the original impulses, sublimations of the same or reactions formed against them.

C. S. R.

[164] General paralysis in State hospitals for mental disease.—EDITH M. FURBUSH. *Mental Hygiene*, 1923, vii, 565.

This is a statistical study, the outstanding facts resulting being summarized as follows: Of all new cases admitted each year to hospitals for mental disease, over one-tenth are cases of general paralysis. It claims nearly four times as many males as females. The great majority of admissions with this disease are in early middle life. A much greater proportion comes from urban than from rural communities. A larger percentage of intemperance is found among persons admitted with this form of mental disease than for any other form except the alcoholic psychoses. General paralysis claims for the most part married men and women. This disease has a low improvement rate and a markedly high death rate, but is less severe among women than among men. The hospital life of persons with general paralysis is shorter than for any other form of mental disease. Its prevalence and fatal character point out the urgent need of more extensive and intensive efforts to check the spread of syphilis, and emphasize the importance of applying treatment in the early stages of the disease so that its later disastrous developments may be prevented.

H. M. J.

- [165] The pathological diagnosis of general paralysis by the detection of iron in the cerebral cortex (Über die Spatzische Methode der anatomischen Schnell diagnose der progressiven Paralyse).—STIEFLER. *Münch. med. Woch.*, 1923, lxx, 704.

HITHERTO the pathologist has been able to make the diagnosis of general paralysis with certainty only by a histological study of the brain cortex, i.e., by a process which requires time, the resources of a laboratory, and much special knowledge. Recently a chemical method of diagnosis, simple and rapid, so that it can be carried out at the time of the post-mortem examination, has been introduced by Spatz, and is described and supported by Stiefler in this paper. It depends on the presence in and around the walls of the vessels in the cortical grey matter of particles of iron-containing pigment. This finding is stated to occur only in two diseases, viz., general paralysis and sleeping sickness (trypanosomiasis), and as in temperate climates the latter of these need hardly be considered in the differential diagnosis, the occurrence of such iron-containing particles in the cortex is to be regarded as pathognomonic of the former.

For the demonstration of the iron-reaction the following directions are given: From the fresh brain cut a thin slice of cortex (preferably frontal or occipital), wash it in normal saline solution, and then place it for not less than fifteen minutes in concentrated ammonium hydrosulphide: a greyish-green coloration forms in the cortex; but in general paralysis there are, in addition, fine black streaks and dots: these are, in fact, the minute cortical vessels, rendered visible by the staining of the iron in their walls. With the aid of a lens such vessels can be picked out with a needle and examined under the microscope.

The iron particles may also be demonstrated by the Turnbull-blue method.

Stiefler has applied Spatz's method to eight cases of general paralysis, two cases of cerebral syphilis, three of encephalitis lethargica and two of cerebral arteriosclerosis, and he obtained a positive reaction only in the cases which gave the histological picture of the first of these.

J. P. M.

- [166] Senile general paralysis (La paralysie générale sénile).—RISER and GAY. *L'Encéphale*, 1923, xviii, 35.

FROM various statistics furnished by observers in Europe and America the authors have collected no less than 2,058 male cases of the disease, in which only seventeen concerned patients of between sixty and seventy, and two between seventy and eighty. Of 814 female cases similarly collated, five were between sixty and seventy, and one between seventy and eighty. Senile general paralysis is therefore a relative rarity, yet the authors are able to add three personal cases, in each of which the onset of symptoms occurred after the age of sixty.

Etiologically, the condition is due to neurosyphilis presumably of particularly retarded evolution. The sexes are affected indifferently. Pathologically, the lesions are those of adult general paralysis. Clinically, there is a greater tendency to local symptoms than in the adult form, largely because of the preponderance of vascular lesions: further, a more or less diffuse poly-

sclerosis leads to symptoms resembling those of ordinary senile dementia. Defects of memory, naturally enough, are prominent. On the somatic side, the signs are those of the adult variety, and may be either pronounced or minimal.

Differential diagnosis is easy when the serological and spinal fluid findings are characteristic; if these are doubtful, the clinical evolution of the case should separate it from cerebral arteriosclerosis and multiple vascular cerebral lesions, as also from alcoholic epileptic dementia, etc. Positive findings, however, do not serve to distinguish senile general paralysis from syphilitic meningitis with mental symptoms, or from tabes with mental symptoms, or from episodic mental confusion, e.g., of alcoholic origin, in a potential neuro-syphilitic. In these cases the evolution of the disease supplies the best aid to diagnosis.

S. A. K. W.

- [167] The lenticular nucleus and mental symptoms (Linsenkern und psychische Symptome).—E. FORSTER. *Monats. f. Psychiat. u. Neurol.*, 1923, liv, 215.

THE author studies the question whether affections of the corpus striatum, lenticular nucleus and basal ganglia can of themselves give rise to psychic symptoms.

This question he answers definitely in the negative, finding that in all cases showing mixed symptoms both lower centres and the cortex are involved, while no psychic symptoms are manifest if the lesion is confined to the lower centres.

ALFRED CARVER.

- [168] The practical value of the study of personality in mental disorders.—GEORGE S. AMSDEN. *Amer. Jour. Psychiat.*, 1923, ii, 501.

THE personality must be studied phylogenetically and ontogenetically. It is narrowly defined as "the aggregate of those tendencies predisposing to reactions which the individual has come habitually to display in the adjustments his life has required of him." The concept is, therefore, closely linked with that of behaviour. In recent studies it is assumed that endocrine activities greatly simplify the problem, but though physiological determinants may have their place, it is in the feeling or emotional components that the life-history rises to its maximum. Long before the psychosis we are able to see in the personality premonitions of neuro-psychiatric trouble. The type of psychotic behaviour may often be predicted from an understanding of the personality, and the behaviour within the psychosis will in general conform to, or be modified by, the personality. Furthermore, from an analysis of the personality we may estimate the degree to which psychotic reactions may remain fixed, and the physician is enabled to map out a treatment or restraining programme with precision. The method of personality-study here described is simple, the aim being to determine the practically important, the habitually preferred reactions. The information, which of course must be checked, is accumulated from all who know the patient, and the more the patient is able to lend himself to the inquiry, the more accurate the result will be. This information can be grouped under four headings: (1) the intellectual activities; (2) the somatic demands; (3) that embraced

by the individual's self-criticism and self-estimate: (4) the urgency or imperative to adaptation.

Under intellectuality are noted the receptive and acquisitive aspects, how past experience is constructively used, the liveliness of the sense of reality, the possible side-tracking of competing interests, the general aptitudes. With regard to the somatic (or psychosomatic) demands, sex interests and the need for motor or psychomotor activity are of importance. More vague demands, such as those indicated by posture, gait, nail-biting, response to skin and mucous membrane stimuli, are noteworthy. We wish to estimate how frankly any demands have been met by the patient, whether they are hygienic or not, whether any sense of guilt is attached to them, and whether they are of a compensatory nature. The estimate of criticism of self as a motive of behaviour is of the utmost interest to the psychiatrist. In unfavourable criticism the door is opened to a wide variety of possibilities, and we may here meet with reactions of a clinging dependent type, evasions, and compensatory and substitutive reactions. In social relations there is found a delicate test for any feeling of security or insecurity. Concerning the urgency which leads us to adapt ourselves, our interest is to determine what tends to favour or impede the operation of this tendency. The inclination to the assertion of this imperative among healthy persons is so general that we may assume that a relative absence of it is pathological. A constructive assertion of it is seen directly in ambition, courageousness and vigorousness generally. These reactions are also displayed in the prosecution of cultural interests, in diversion, sports, games and hobbies. We should make a rule always to account for a marked diminution of these reaction tendencies. Experience has proved that a personality survey on the above lines has practical value.

C. S. R.

[169] **General pathology and its relationship to certain diseases.**—ROBERT A. KEILTY. *Amer. Jour. Psychiat.*, 1923, ii, 615.

1. MENTAL diseases are primarily or secondarily dependent upon general body diseases unless they are purely the result of a specific stimulus or of hereditary deficiency.

2. In order more clearly to study body correlation, the classification of mental diseases must be simplified either clinically, morphologically or etiologically.

3. Heredity plays a prominent rôle and lowers the mental threshold so that somatic influences, which would otherwise pass unnoticed, become prominent.

4. Somatic influences start in early life and are toxic in nature, either bacterial, chemical, or both, and may be especially operative in præcox cases.

5. Blood vascular changes are retroactive, and occur in later life, leading to hæmorrhage, degenerations and scleroses.

6. The future of the psychoses rests rather with the preventive hygienists, especially where an individual is recognized as a mental hazard.

7. Foci of infection play certain definite rôles, and must be removed before permanent changes have been produced by their long-continued dosage.

C. S. R.

TREATMENT.

- [170] The treatment of general paralysis by infection with malaria.—W. McALISTER. *Brit. Med. Jour.*, 1923, ii, 696.

TWELVE cases of general paralysis treated by malaria are here reported on. The writer candidly admits that the remedy is empirical and quotes the claims of Wagner von Jauregg and Weygandt in respect of its value.

Blood was obtained from a malarious patient by vein puncture during a paroxysm; in the general paralytics the site of injection was the loose skin below the angle of the scapula. In every case the infection 'took' and parasites were recovered from the blood. The infection was allowed to run its course unimpeded for any number of paroxysms up to twelve, and was arrested by quinine hydrochloride. In no case was there a relapse. The results were as follows. Two patients died, one of peritonitis and one of general paralysis; two improved both mentally and physically; four improved slightly; and three remained *in statu quo*.

Jauregg's finding that the condition of the blood and cerebrospinal fluid is uninfluenced by the treatment is confirmed.

None of the patients was the worse for the treatment, and although none could be said to be cured, it is claimed that with improvement in six cases the experiment is justified. The writer concludes with the questions: Is it the high temperature that is incompatible with the well-being of the spirochæte? Is the permeability of the choroid plexus influenced by the malaria? Or, if neither, what is the subtle change?

DAVID MATTHEW.

- [171] The treatment of general paralysis by malaria.—A. R. GRANT. *Brit. Med. Jour.*, 1923, ii, 698.

WHILE admitting the impossibility of the restoration of degenerated cells, the author hoped for the destruction of the spirochetes and the complete and permanent arrest of degeneration. The hypothesis is tentatively put forward that the *modus operandi* is by high temperature and impoverishment of the blood, with its sequel the reactivation of the immunity processes. This is what is aimed at. After experimental inoculation, a certain strain of benign tertian malaria was found to meet the conditions and was used to inoculate forty cases. The ages of the patients ranged between twenty-one and fifty-six years. Where possible the blood of the malarial patient was injected directly into the general paralytic, otherwise was citrated. It was found that the attacks of malaria could be controlled by quinine, and no relapses took place.

In all cases the diagnosis was confirmed by serological tests and a complete examination of cerebrospinal fluid. Five cases are summarised shortly in detail. Of the forty cases, three patients were discharged to their homes, and are now following their usual occupation. Three formerly 'wet and dirty' are now cleanly in their habits. Two formerly confined to bed are now 'up and about.'

The author claims to have recorded preliminary observations only, in the hope that he may refer to them later. In conclusion he states that experiments on similar lines are being carried out, using the virus of relapsing fever, to which he hopes to refer on a future occasion.

DAVID MATTHEW.

- [172] A critical review of a series of mental cases operated on for removal of a focus of infection in the cervix uteri.—WARD LANGSTROTH. *American Medicine*, 1923, xviii, 273.

Focal infections of the cervix are regarded as one of the most frequent causes of nervous and mental diseases in women. The writer figures that approximately 49 per cent. of all parous and 13 per cent. of all nulliparous women are carrying a chronic infection of the cervical endometrium, which may at any time, under an increase of either a mental or physical load, produce the most disastrous results. It is stated that the following results were in evidence from the treatment of fifty cases. Improvement was noted in eighteen cases after removal of foci in teeth, tonsils, etc., but no case was cured. From removal of the focus in the cervix twenty-one cases were improved; fifteen of these had shown no improvement from the removal of the other foci, the other six had shown some. After the removal of their infected cervical endometrium seventeen cases are reported to have recovered mentally; eleven of these showed their first improvement after removal of foci in the teeth, etc., the other six showed no improvement until the cervix operation was done; then they recovered. The 21 cases improved were of the following mental groups: Unclassed, 3; exhaustion delirium, 1; manie-depressive insanity, not classified, 3; manie-depressive insanity, depressed, 4; epilepsy, 2; constitutional inferiority, 1; dementia præcox, 3; paranoid condition, 2; psychasthenia, 1; imbecile, 1. The 17 cases reported cured were as follows: Manie-depressive, not classified, 4; manie, 2; depressed, 5; toxie psychosis, 1; hypomania, 1; neurasthenia, 2; dementia præcox, 1; unclassified, 1. It is said that 14 of the 17 cases reported as mentally recovered have remained so four years later. It must be understood that these cases were thoroughly cleared of all other known areas of infection before they reached the gynecological department.

C. S. R.

Reviews and Notices of Books.

Lehrbuch der Nervenkrankheiten für Ärzte und Studierende. By H. OPPENHEIM. Seventh enlarged and corrected edition, edited by R. CASSIRER, K. GOLDSTEIN, M. NONNE, and B. PFEIFER. In two volumes, with 598 illustrations and 13 plates. Pp. 2316. 1923. Berlin: S. Karger. Price not stated.

THE text-book of nervous diseases written by the late Professor H. Oppenheim has long since become a classic, and in its new, seventh, edition represents the high-water mark of attainment in neurology founded largely on the clinico-anatomical method. Its success, its international fame, are based on its comprehensiveness, its readableness, its abundant references to the literature—above all, on the combination exhibited by its distinguished author of wide clinical and pathological experience, shrewdness in estimating the value of the neurological contributions of others, and fairness of comment on the many vexed nervous problems of the day. We feel that these qualities stamp the production with the hall-mark of soundness and worth, and we commend it afresh to a new generation of students and neurologists to whom Oppenheim can now, unfortunately, be no more than a name.

The four well-known German authorities under whose ægis this new edition has appeared state in their introduction that since the death of their teacher there is no one in Germany capable, by himself, of dealing with the whole wide range of present-day neurological doctrine, hence the collaboration which the appearance of their names on the title page implies. They have endeavoured to incorporate recent advances in knowledge, more especially such as have resulted from the experiences of the war. Epidemic encephalitis and extrapyramidal diseases are among those which have been more fully considered. In the tables of contents the chapters revised by the four new editors respectively are indicated.

Dementia præcox, intermediäre psychische Schicht, und Kleinhirn-Basalganglien-Stirnhirnsysteme. By DR. MAX LOEWY, Privatdozent for Psychiatry and Neurology in the German University, Prague. Pp. 120. 1923. Berlin: S. Karger. Price not stated.

THE thesis sustained in this monograph is, briefly, that the symptomatology of dementia præcox is largely one of psychomotor disorder, coupled with disturbances in the affective and intellectual spheres. These symptoms can be regarded as impairment of function of an 'intermediate psychic layer,' an assumed functional field lying between the 'Allopsyche' and the 'Somato-

psyche' of Wernicke, i.e., between consciousness of the external world and consciousness of one's own body; here the author places, schematically, the functions of common sensibility, psychomotility, and of the emotional life. The argument is that, on the authority of Kleist, physiological dysfunction of the anatomical cerebello-thalamo-frontal system gives rise to symptoms of a psychomotor kind analogous to those observed in dementia præcox: hence it is suggested that the anatomical basis of the symptoms of that disease will be found to consist of lesions in the associational system mentioned. No pathological proof, however, is vouchsafed the reader, who will probably feel that neither the anatomical nor the psychological explanations of the disease given by the author are sufficiently comprehensive, apart from the difficulty of including symptoms of an endocrinological order in the scheme. The views advanced, however, are not lessened in interest because of their speculative character.

Essai sur les caractères intrinsèques des secousses musculaires et des mouvements involontaires rythmés observés au cours de l'encéphalite épidémique. By DR. EDUARD KREBS. Pp. 156. 1923. Paris: Jouve et Cie. Price not stated.

THIS thesis emanating from the service of Dr. J. Babinski contains a useful clinical analysis of certain of the involuntary movements that have occurred with considerable frequency after attacks of epidemic encephalitis.

Two groups are distinguished: (1) Bilateral, more or less symmetrical, rapid, short, involuntary muscular contractions resembling those usually called myoclonic; (2) unilateral, relatively slow, comparatively infrequent spasm-like contractions involving all the muscles of a limb or segment of a limb, occasionally spreading to neck or trunk, and always leading to a change of attitude for the time. With either of these groups other disturbances of motility, e.g., of a Parkinsonian nature, may be associated. Dr. Krebs considers that the myoclonias of the first class can be separated by their intrinsic characters from the varieties hitherto recognized, and he is of the opinion the spasms of the second class approach spasmodic torticollis, athetosis, and chorea, as well as torsion-spasm, in their main features.

The pathogenic and pathologico-physiological explanations of the syndromes, unfortunately, are not examined by the author. A bibliography is appended.

L'Encéphalite épidémique: étude clinique sur l'épidémie récente d'encéphalite en Alsace-Lorraine. By DR. LOUIS REYS. Pp. 146. 1923. Paris: A. Maloine et Fils. Price not stated.

DR. REYS's clinical study is based on some 150 cases of the disease occurring in epidemic form in Alsace-Lorraine in 1920-21: in 1922 only two fresh cases came under observation though epidemic influenza was rampant in France at the time. Males were affected about four times as often as females; the age of the youngest patient was five months, and of the eldest sixty-three years. Dr. Reys gives a useful clinical summary and double classification, distinguishing eight cardinal anatomo-clinical varieties (mesencephalie,

bulbar, lenticular, thalamic, cortical, meningeal, neuritic, and meningo-myelodradicular) and six evolutionary forms (acute, subacute, relapsing, 'fruste,' ambulatory, slow-progressive). Sequelæ and treatment are discussed: many useful statistical tables add to the value of the clinical documents.

Some Applications of Psycho-Analysis. By Dr. OSKAR PFISTER.
Authorized English Version. Svo. Pp. 352. London. George Allen and Unwin. 1923. Price 12s.

THE book is started by a chapter of special pleading in defence of the psycho-analytic method as compared with those of orthodox psychology. Certain examples are given of problems which could not be elucidated by any other method.

Next, a series of pictures by a neurotic artist is analysed in the same way as dreams, but the material is too restricted to be of much service to æsthetics. It is, however, suggestive that much might be learnt with regard to this difficult subject were more careful attention paid to the relation and interaction of the stimuli with the conscious and unconscious 'wishes' of the artist. But it would also be necessary to pay attention to the complexes and resistances of the critic as well.

The author then turns to the psychology of war and peace. The former he describes as a regression to primitive barbarism due to the discovery by the nations that the life-task they have undertaken is too difficult of achievement. Peace, if it is to be real and lasting, may necessitate a regression of a different kind to the childlike simplicity illustrated by New Testament teaching, but it must be associated with a progression towards sacrifice and altruism.

A long chapter is devoted to psychoanalysis and philosophy. After a demonstration that Freud and his followers take a positivist standpoint, the views of various analytic authorities towards both metaphysics and ethics are given. Finally, the author gives his own views as to the relation of psychoanalysis to ethics and concludes that while the analyst must be careful not to let ethical considerations intrude too much into his therapeutic efforts, a successful analysis tends to improve the ethical standard of the subject by means of the Socratic method of fuller self-knowledge leading to better self-discipline. A chapter pointing out the importance of analytic investigation in the understanding and treatment of difficult and abnormal children follows, with a fairly complete analysis of a neurotic of twenty-five showing how his early conflicts determined his condition. Finally, the possibilities of psychoanalysis in missionary work are discussed, the resemblance between various primitive religious cults and neurotic symptoms being pointed out.

The book is certainly interesting, and if there is nothing startlingly new in it, the author is not led away into any extremes of hypothetical reasoning. However, with all the assertion as to the use of psychoanalysis in freeing the soul from its fixations, there is more than a little in the book which suggests a fixation of a somewhat emotional and infantile type on the person of Sigmund Freud.

R. G. GORDON.

Character and the Unconscious. By J. H. VAN DER HOOP. Translated by ELIZ. TREVELYAN. Pp. 223. London: Kegan Paul, Trench, Trübner & Co., Ltd. 1923. Price 16s.

THIS book purports to be a critical exposition of the psychology of Freud and Jung. If the critical attitude is not particularly noticeable the book nevertheless performs a useful function in presenting a clear and concise account of the main features of the teachings of these two pioneers of the so-called new psychology. The author has succeeded in demonstrating that in spite of controversy and no little acrimony the two protagonists are not really antipathetic but supplementary. Freud takes the extrovert empirical analytical approach, while Jung is the introvert theoretical synthetic reasoner. Each has the advantages of his method, but also the faults and limitations, which are more liable to become manifest in the case of their less able disciples than in their own writings. The first three chapters are devoted to an exposition of the chief applications of Freud's teaching to normal life as opposed to neuroses, in dreams, everyday life and the development of the libido. Next, the analytic and synthetic standpoints are contrasted, the latter leading to an exposition of Jung's psychological types. Finally, the relationship between conscious and unconscious is discussed, and the author rightly points out that there is no such hard and fast distinction between them as some of the Freudians would have us believe. The style is lucid, and the translator is to be congratulated on the fact that it is almost impossible to detect that the work was not originally written in English. Although the book is short and therefore necessarily superficial in parts, it can be confidently recommended as a most useful adjuvant to the study of the original works of the two chief psychoanalysts.

R. G. GORDON.

Diseases of the Nervous System: A Text-book of Neurology and Psychiatry. By S. E. JELLIFFE, M.D., and W. A. WHITE, M.D. Fourth Edition, revised, rewritten, and enlarged. With 475 illustrations and 13 plates. Pp. 1119. 1923. London: H. K. Lewis & Co. £2 2s. net. Philadelphia: Lea and Febiger. \$9.00.

THIS now well-known text-book of neurology and psychiatry appears in a fourth edition, evidence of its continued appreciation. It offers the reader a modern account of nervous and mental disease regarded as the outcome of defect of structure or function at three levels of activity, viz., vegetative, sensorimotor, and psychical. Within its boards, therefore, will be found manuals of endocrinology, neurology, and psychiatry, in the ordinary acceptance of the terms: these, individually considered, are complete enough for practical purposes—as far as the student is concerned they provide an adequate compendium of knowledge in the several divisions of the subject. The book is well and clearly printed and excellently illustrated, the authors having selected by far the greater number of their figures from the best sources in the literature.

The authors wish to be judged not by their book's up-to-dateness, but by the spirit of research and stimulus to thought which they believe it contains.

Their plea for unification of neural disorder, whatever its site in physiological levels, must command respect ; and in actual fact the scheme must prove of value, since the clinician is daily confronted with problems ranging from endocrine hypofunction to unconscious repression. We do not know of any modern text-book dealing with similar material in which the subject is tackled with the same comprehensiveness and boldness. On the other hand, we have been familiar with the volume from its first appearance, and still think it somewhat unequal and unsatisfying from the viewpoint of the professional neurologist or psychiatrist. Various conditions are dealt with so summarily (as an example, combined scleroses of the cord) as to convey little real information: not a few rare diseases seem to be omitted altogether—for instance, Pelizaeus-Merzbacher's disease, Schilder's encephalitis, uveo-parotitic paralysis. The neurologist using the book for reference will not always find his search rewarded. In other instances (e.g., carbon monoxide poisoning) the pathological details vouchsafed are meagre and incomplete.

The truth is, it is difficult to condense all knowledge of visceral, nervous and mental disease into one volume in such a way as to satisfy beginner and expert alike. The continued success of this encyclopædic effort at such condensation is, however, a sufficient answer to any criticism.

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Original Papers.

SOME PROBLEMS IN NEUROLOGY.

BY S. A. KINNIER WILSON, LONDON.

No. II.—PATHOLOGICAL LAUGHING AND CRYING.

THE problem presented by certain cases of abnormal emotional expression, in the guise either of exaggerated or uncontrollable laughing or crying, or, conversely, of paralysis (at least in part) of the same mechanism, has not attracted much attention in recent years: nor has much detailed criticism been offered, or advance made, on the position adopted by Nothnagel¹ forty years ago in reference to the latter, or by Brissaud² thirty years ago in respect of the former. From time to time doubts have been cast on the tenability of the hypotheses, yet little of a constructive nature has taken their place. The time seems opportune for a revision of the whole question, and for the offering of a somewhat different explanation of the syndromes. Again, as long ago as 1884, Professor William James³ admitted with characteristic candour that if the hypothesis of the emotions suggested by him "is ever to be definitively confirmed or disproved it seems as if it must be by asylum physicians and nervous specialists, for they alone have the data in their hands." As far as I am aware, however, no attempt has been made thus to prove or disprove it in the light of neurological knowledge derived from clinico-anatomical facts, so that a tardy contribution from this viewpoint also may not be without interest.

DEFINITION AND DELIMITATION.

At the outset the ground must be cleared by specifying exactly what is meant, for the purposes of this communication, by pathological

laughing and crying. In the first place, reference is made solely to cases of organic nervous disease, cases in which, as a sequel to and consequence of a recognizable cerebral lesion or lesions, 'attacks' of involuntary, irresistible laughing or crying, or both, have come into the foreground of the clinical picture. It must be clearly understood that a not unnatural result of severe or chronic nervous disease may be a general depression of spirits, favouring tearfulness and irritability and other manifestation of an emotionally altered psyche, but such conditions are not here considered. The emotional outbursts of the hysteric and the facile moods of the neurasthenic, likewise, are foreign to our subject. Patients, too, who suffer from cerebral arteriosclerosis, in particular those in whose cases other indications point to impairment of function of the basal portions of the brain from an *état lacunaire* or other vascular change, often exhibit signs of an abnormal emotional state, and while this is, without doubt, the direct result of the disease, the usually diffuse nature of the latter precludes its being utilised for topographical purposes. Occasionally, however, the symptoms make their appearance in an arteriosclerotic case after an ietus, or series of these, and in such examples the localizing value of the syndrome may be in no way inferior to that of other cases with a more restricted and clean-cut pathological process for a basis. Allusion, therefore, is made to the occurrence of exaggerated, forced, involuntary, uncontrollable laughing or weeping—the *Zwangslachen* and *Zwangsschreien* of German writers, the *rire et pleurer spasmodiques* of the French.

In the second place, the comparatively rare cases of organic disease in which there is conservation of voluntary facial movement with paresis or paralysis of the same musculature for the involuntary movements of laughing or smiling have long been known to the neurologist. This defect in the mechanism of laughing is clearly but a part, and it may be only a small part, of the total somatic expression of that particular emotional state, nevertheless as such it is deserving of close attention. Its significance will be duly considered in this paper, and a fresh explanation offered of its pathological physiology.

CLINICAL ILLUSTRATIONS.

I. Among the organic affections apt to be associated with the occurrence of pathological laughing or crying may be enumerated double hemiplegia, pseudobulbar paralysis and disseminated sclerosis; their appearance after a single hemiplegia has also been observed, and, as remarked above, the symptom-complex is of moderate frequency in certain stages of basal degeneration from diffuse vascular processes. The exact nature of the morbid affection is of less importance than its site; tumour growths, infective conditions, or vascular degenerations,

provided they are appropriately situated, may produce the symptoms indifferently.

By way of clinical illustration some personal cases may now be cited.

1. *Double Hemiplegia*.—One case of 'crying' and one of 'laughing' may be selected.

Case 1.—A woman of fifty-seven had suffered from left hemiplegia for one year, when a second stroke occurred involving the right side. Ever since the latter the daughter remarked that her mother had become, as she put it, 'hysterical,' laughing and crying at nothing.

On examination the patient was seen to have a distinctly vacant, apathetic facial expression at rest. She was able to move the facial muscles voluntarily on both sides, though there was slight weakness of the left corner of the mouth. On the slightest stimulus, even when the observer simply came to



FIG. 1.—Case 1. Pathological crying in a case of double hemiplegia.

her bedside, she at once assumed a most lugubrious expression, her mouth opened widely, and a long, almost noiseless bout of weeping ensued, lasting for many seconds, even minutes, at a time (*Fig 1*). During this spasmodic crying both sides of the face moved equally, and the eyes suffused with tears. Laughing attacks were extremely rare in comparison with this incessant weeping.

Case 2.—A man, aged sixty-seven, had two strokes in the same year (1916): the first was on the right, with very moderate aphasic disorder; the second was on the left, and comparatively mild. Ever since the first attack, and to an increasing degree since the second, he had exhibited characteristic involuntary laughing. Whatever the emotional stimulus, and however slight, he at once began to laugh, and laugh loudly. Thus on reading the war news he used at once to begin to smile, and the more serious and anxious the news, the more he laughed.

On examination there was some voluntary facial paresis on both sides, especially the left, some dysarthria, and some dysphagia, but during the laughing the facial movements were in no way restricted. A double extensor response was present.

2. *Pseudobulbar Palsy*.—The syndrome occurs in this affection with

greater frequency than in any other (*Fig. 2*). Hartmann⁴ reports eight cases of pseudobulbar paralysis, in every one of which moderate or slight voluntary weakness of facial movement was associated with pronounced spasmodic laughing or crying, or both. Similar clinical examples have been recorded by Schaffer,⁵ Weisenburg,⁶ and many others. Instead of quoting personal cases I shall take this opportunity of referring in some detail to the remarkable instance of the affection reported by my former teacher, the late Dr. Charles Beevor.⁷ As it was published in a somewhat out-of-the-way foreign journal it has never received the attention which its altogether unusual features amply justify. It so happens I am in a position to add some facts to Dr. Beevor's striking study of the case.



FIG. 2.—Pathological laughing in a case of syphilitic pseudobulbar palsy.

Case 3.—A young man of twenty-three, known to have been infected with syphilis, had three hemiplegic attacks, two involving the left side and one the right, as a result of which there was *complete* loss of all *voluntary* facial movements as follows: closing the eyes, elevation and retraction of the angles of the mouth, opening the mouth, closing the mouth: there was likewise absolute loss of voluntary biting, deglutition, phonation with elevation of the palate, and of voluntary inspiration and expiration (such as coughing). Both sides were affected equally. Contrasting with this profound degree of volitional palsy was the preservation of the emotional movements of laughing and crying. The patient was continually laughing: in fact, on the slightest provocation, or on none, he went off into

a torrent of laughter, which made examination of his facial and respiratory condition very difficult. The reflex movements of coughing, sneezing, and yawning were readily obtained, but it was observed that in laughing the angle of the mouth was not retracted so well on the left side as on the right, indicating slight diminution of the emotional facial movement on the left, whereas in yawning the facial movement was symmetrical. As the patient was unable to open his mouth, it was the habit of the house physician to sit at the foot of the bed and yawn deliberately. Eventually the former caught the infection and yawned automatically, whereupon the Sister of the ward promptly took the chance of popping food into his mouth.

A further illustration of the phenomenal *rire spasmodique* may be added to the account. It so happened about this time that a peripatetic quack was touring the minor music halls of London and claiming to cure all and sundry complaints by means of electricity. The patient went to this individual, and was shown on to the stage. Diagnosed as hysterical by the electric 'expert,' he was submitted to a series of violent and extremely painful electrical applications, but the more they hurt the more he laughed, till at length he was quickly hustled off, and on his return the following evening was refused admission.

In view of its almost unique nature and significance from the standpoint of the mechanism of laughter and its localization, further reference is made to this case below.

3. *Single Hemiplegia*.—It is not a little curious to note how many cases have been recorded in which a single ictus seems to have precipitated the tendency to the symptoms under consideration. Examples have been given by Brissaud,² Broadbent,³ Burzio,⁹ Mills,⁵⁸ and others. In some instances, doubtless, there is more widespread vascular disease than the single stroke would indicate, and in some tumour cases, similarly, there is greater disturbance of cerebral function than the unilateral symptoms by themselves suggest. Yet the onset of the syndrome may undoubtedly coincide with the appearance of limb symptoms which are strictly one-sided.

Case 4.—A woman of fifty had an attack of right hemiplegia and aphasia, and thereafter became peculiarly lachrymose, bout after bout of weeping succeeding each other all through the day, with copious tears. Thus, when I used to come to her bedside, this was the unvarying signal for a fresh outburst of uncontrollable crying; in fact, whenever she was spoken to the same occurrence was noted. On examination there was slight volitional weakness of the right side of the face, but the asymmetry was not observed during the bouts of weeping. Before the hemiplegia no such emotional overaction had ever been noticed.

Case 5.—A male patient, aged fifty-nine, presented in a fairly typical form the thalamic syndrome in association with a left hemiplegia. Thus, in addition to the corticospinal symptoms (extensor response, etc.), there was found on examination objective diminution to painful and thermal stimuli over the same side, with highly characteristic over-reaction: an athetoid attitude of the hand was also noted, and occasional involuntary movements of the same. He complained of constant and severe 'burning pins and needles' in the left arm and left side of the face.

In addition, the patient presented the symptom of involuntary laughter in a marked degree. This had made its appearance after the stroke, but it should be stated it was greatly augmented when, some two years later, weakness of the right side, associated with some sensory change, began to develop.

Though involuntary laughing or crying is not regarded as in any sense a usual or even occasional accompaniment of the so-called 'thalamic syndrome,' there is no reason why it should not sometimes happen that the two are combined, and the above is an instance in point. A similar example came under my notice a number of years ago, in which spasmodic weeping took the place of the laughter of case 5.

By way of contrast, allusion may here be made to a series of cases published by Féré,¹⁰ under the title of '*Le fou rire prodromique*.' In these the onset of irresistible emotional overaction preceded the development of hemiplegia. In the first case an elderly gentleman of sixty-four began to suffer from *rire spasmodique*, being convulsed with laughter over trifles and failing altogether to inhibit the performance. A few

months later this was followed by right hemiplegia and, subsequently, by left, and death ensued from pseudobulbar paralysis. The second case was that of a man, also aged sixty-four, in whom uncontrollable explosions of laughter, from minimal stimulation, were followed always by an irresistible desire to sleep. These phenomena were of daily occurrence for some four months, when a severe left hemiplegia supervened. In view of the particularly interesting fact that, thereafter, all involuntary explosive laughter ceased up to the date of the patient's death, eighteen months later, it is regrettable that further exact details of the neurological condition were not given.

No case of this description has come under personal notice, but I have seen a case of disseminated sclerosis in which risibility, amounting on occasion to involuntary laughing, was the first symptom to attract attention.

4. It is unnecessary to furnish clinical examples from cases of other organic affections of the nervous system, but an exception may be made in respect of disseminated sclerosis, because of the frequency of the syndrome in that disease.

Case 6.—In the case of a man of thirty-two, with the typical symptoms of the affection, attention was first directed to the emotional change by the fact that when reading of a perfect stranger's death he would begin to weep; with the narration of amusing incidents exaggerated laughing would set in. Under observation bursts of long, uncontrollable, but almost noiseless laughter took place at the veriest trifles. In the course of my examination I asked the routine question whether he had any difficulty with the bladder, and replying in the affirmative, he added he had already 'ruined four pairs of trousers,' and went off into an apparently interminable series of peculiar hollow laughs, which convulsed the whole ward as well as himself. So facile became the mechanism, so completely without control, that he would laugh whenever he began to speak, as though the stimuli of contracting muscles were sufficient to set it off.

II. It is time, however, to turn to cases characterized by volitional normality but emotional abnormality of facial movement.

Hitherto, in the majority of the quoted cases, it has been remarked that any asymmetry of voluntary facial action disappeared when the features have been innervated under the influence of stimuli of the emotional order. The occurrence of facial paresis or paralysis in emotional expression is a very old observation. Almost a century ago Sir Charles Bell¹¹ wrote: "As you find the portio dura in possession of distinct properties, all of them related to respiration, breathing, speech, and expression, you will not be surprised that these functions should occasionally be differently affected; as, for example, a man will continue to possess the power over the nerve, as the nerve of speech, and yet he will be incapable of expressing the usual signs in laughter or in crying. In short you find that your patient sometimes exhibits

paralysis of the side of the face only when he smiles or laughs, at other times it is not observable." An old but impressive clinical illustration is furnished by the case recorded by Stromeyer¹² in 1837, concerning a girl of twelve years, "in whom the right side of the face continued expressionless in emotions, and showed no increased action in accelerated respiration after running, going up stairs, etc. Nevertheless, the child was as able to control the muscles on this side as those on the left; she could move the angle of the mouth, dilate her nostrils, wrinkle her forehead, and contract her eyebrows at will. . . . On compressing the epigastric region, it appeared that the right



FIG. 3.—Case 7. Normal volitional facial movements.



FIG. 4.—Case 7. 'Mimic palsy' of left side of face in laughing.

half of the thorax scarcely took any part in the forcible (involuntary) thoracic respiration which was induced by the pushing back of the diaphragm. When this kind of examination was made, the apathy of the one half of the face was particularly manifested at the nares; whilst the right one remained immovable, the left one expanded fully at every act of inspiration." Ancient though it is, this case is particularly informative and will be referred to again.

Numerous examples of the combination of voluntary control with involuntary paralysis have since been recorded (Nothnagel,¹³ Bayerthal,¹⁴ Mills,¹⁵ Borst,¹⁶ Nonne,¹⁷ Monrad-Krohn,¹⁸ and many more). Of various examples that have come under personal observation three only will be cited.

Case 7.—A young woman of twenty-seven had suffered for six months from increasing headache, giddiness and attacks of vomiting. Her cerebra-

tion became slower and her memory poor. For about the same time weakness and parasthesiae of the left limbs had been observed.

On examination the optic discs were clear but hyperæmic. Objective evidence of a slight left hemiparesis (arm and leg) was obtained. When the patient showed her teeth, closed her eyes, etc., no paresis of the left face was discoverable, but on emotional stimulation a striking asymmetry was at once shown, the left side exhibiting a considerable degree of 'mimic paralysis' (Figs. 3 and 4). The later course of the case indicated more definitely the presence of a cerebral tumour in the region of the right internal capsule and right regio subthalamica.



FIG. 5.—Case 9. Normal volitional facial movements.



FIG. 6.—Case 9. Emotional or 'mimic' palsy of left side of face in laughing.

Case 8.—A male patient of forty-one, known to have had syphilis, suffered from a stroke on the right side involving arm and leg, and not long thereafter developed a highly typical right posthemiplegic hemitremor. On examination it was found that the left pupil was inactive to light and reacted poorly with convergence, whereas the reactions of the right pupil were normal. Lateral conjugate deviation was good in both directions, but upward and downward movement was very poor indeed. Voluntary movement of the facial musculature was normal on the two sides, whereas on smiling the right facial movement was minimal, and on laughing the difference was notably accentuated. That is, the right side of the face exhibited expressional paralysis.

Case 9.—A girl, aged seventeen, developed the characteristic symptoms of intracranial tumour in the shape of headache, giddiness, vomiting and papilloedema. The presence of a double Argyll Robertson pupil, nystagmus,

tremor, inco-ordination in finger-nose test (left), etc., pointed clearly to a mesencephalic localisation.

On volitional movement of the face no defect was observable, but on expressional movement (laughing) the left side of the face moved only slightly, whereas the right side moved normally (*Figs. 5 and 6*). At the autopsy a tumour was found situated in the tegmentum and upper pons, involving the left side more than the right (*Fig. 7*).



FIG. 7.—Case 9. Tumour of mesencephalon, involving mainly the left side, and interfering with the non-volitional faciorespiratory path through the tegmentum on that side.

It is worth noticing that in all the reported instances, as far as I have been able to ascertain, this paresis or paralysis of involuntary facial movement has been on one side only. No bilateral case seems to have been observed: none has come under my notice, and a similar remark has been made by Spiller.¹⁹

THE EMOTIONAL FACTOR IN PATHOLOGICAL LAUGHING AND WEEPING.

The natural question that must arise for discussion is whether the emotional outbursts of which descriptions have been given correspond

to, or reflect, the mental state of the individual concerned at the moment of their expression. Is there a strict relationship between the patient's feelings and their exteriorization as noted by the observer? Are such overwhelming laughter and tears activated by appropriate stimuli, or do they in their turn induce the appropriate frame of mind, or have they any emotional content at all? To enable us to come to some decision the following considerations appear pertinent.

1. The stimuli are often inadequate and inappropriate. Instances have already been supplied of the truth of this statement. One patient (case 4) cried when she was spoken to, when any one sat beside her, when a hand was laid on her arm. In a case reported by Giannuli,²⁰ the patient, a man of sixty-six, used to walk about the hospital with his eyes glued to the ground; if he so much as raised them to meet anyone else's gaze he was immediately overcome by compulsory laughter, which sometimes lasted for four or five minutes. Knowing the irresistible nature of this phenomenon, he spent his days in endeavouring to avoid even the most trifling of stimuli. Brissaud² recounts the history of a patient of his, an intelligent hemiplegic, who was told incidentally by a lady that her little dog was dead: in a moment the fountains of emotion were opened: a mournful visage was succeeded by tears, and tears by sobs, and sobs, unfortunately, by a Rabelaisian effect on his sphincters. Another of Brissaud's patients, a student with syphilitic hemiplegia, was forced to abandon novel reading: "*les malheurs de l'héroïne le font éclater en sanglots, ses joies lui donnent de véritables transports.*" Reference has been made (case 6) to spasmodic laughter accompanying the mere attempt to speak: Giannuli's patient, similarly, laughed as soon as he opened his mouth to describe the pain he suffered from renal disease. I have already mentioned how one of my patients (case 2) laughed at grave war news.

In not a few cases, therefore, the emotional exhibition develops at the bidding of stimuli so minimal as to escape detection: in others, it is motivated by impulses appropriate enough if trifling, but it is excessive out of all proportion to the impressions originating it: in still others, a stimulus of a particular quality is followed by an emotional outburst of a contradictory sort, to which it is not appropriate. Intelligent patients suffering in this fashion are often conscious of the insufficiency of the psychical impulse, and the more intelligent they are the more painfully aware do they become of the incongruity in their affliction.

2. From what has been said it will be understood that the apparent, visible emotion does not necessarily correspond to the patient's real feelings at the time—an observation which has often been made. *Apropos* of some cases of disseminated sclerosis, Oppenheim⁴⁷ says that "the patient has to laugh against his will, although his mood is not gay; this distresses him greatly." A patient of sixty-three, whose case is

given by Dupré and Devaux,²¹ a pseudobulbar with excessive attacks of laughing and crying, indicated by gestures of impatience and denial how much he was annoyed and ashamed at his performances, and how he suffered in mind at the constant caricaturing of his real feelings by their outward expression. A patient of my own (case 5) told me, with every sign of disgust, how one day his daughter had hinted plainly enough that she thought "Dad was putting it on a bit"; incensed at her unbelief, he rose from his chair to give her a box on the ears, but, his legs giving way, he had to throw his arms round her neck to keep himself from a fall, and in this (for his angry state of mind) irritating and ignominious position he burst into explosive laughter. I have endeavoured to ascertain from intelligent patients whether when thus overcome by laughter against their will and in opposition to their real feeling they do not, in spite of the latter, end by experiencing the emotional state commonly associated with laughter, and I am satisfied it is not so, in some instances at least. On the other hand, Moutier²² was informed by a young pseudobulbar patient that a single or brief attack of *pleurer spasmodique* left him quite indifferent, whereas prolonged and repeated bouts had the effect of saddening him and of bringing on tears legitimately motivated by the thought of the infliction under which he laboured.

Thus if the exaggerated laughter or weeping of the hemiplegic or pseudobulbar may, and often enough does, correspond to his emotional mood of the moment, it is not so always; we can scarcely suppose that inextinguishable laughter represented the feelings of the patient (case 3) undergoing painful treatment at the hands of a showman.

3. As a further point, it is important to note in some instances the invariability of the emotional response, whatever the stimulus. Some of the sufferers can only laugh, others can only weep. Why this should be so is not easy to determine. Every one knows that laughter and tears are said to be 'near each other.' Crile's²³ theory in respect of normal emotional activity is that both laughter and crying have the purposeful effect of utilizing released kinetic energy, and of 'working it off' until it is neutralized. Hence one may pass into the other almost indifferently. In some pathological cases, none the less, the mechanism seems to be 'set' for one only. On the whole, a rough generalization suggests that in cases of disseminated sclerosis the manifestation is one of cheerfulness: in pseudobulbars laughter and tears occur indifferently; in arterio-sclerotic cases tearfulness seems to predominate. Be this as it may, the evidence here adduced points to not infrequent conflict and incongruity between the patient's state of mind and its outward exhibition.

The difference in type, however, must not be taken too absolutely. Brissaud²⁴ gives an amusing description of a patient with extremely marked *pleurer spasmodique*, whose facies during the 'attack' became

'*affreusement grimaçant.*' In the bed next to him was a case of *rire spasmodique*. The latter patient used to roar with laughter at the weeping of the former, and this on occasion led the first to change his *pleurer* to an equally phenomenal *rire*, though the tears and the lachrymose physiognomy to some extent remained through it all.

It is important, at the same time, to be assured of the fact that the emotional display is a genuine manifestation of feeling. No one who has seen these attacks of involuntary laughing or weeping can doubt the reality of their emotional content. Let it not be supposed they are mere 'play-acting.' On the contrary, prolonged exhibition of every manifestation of grief, in facial expression, respiratory accompaniment, and secretion of tears, or, alternatively, equally patent demonstration of hilarity, in features, respiratory movement, rosy and suffused countenance, and tears too, it may be, is too definite to be mistaken for the mere 'shell' of a mental state empty or devoid of emotional tone. I cannot, therefore, agree with Bianchi⁶⁰ when he declares that the "weeping and laughter of such sufferers are only *simulacra* of the real emotions." The display gathers impetus as it proceeds, and if it is initiated by trifling stimulation, and in a comparatively cold emotional atmosphere, its avalanche nature is conclusive proof of the involvement of the entire mechanism, somatic and visceral, of emotional expression. In a word, it differs from legitimate emotional performances solely in its inevitability, its frequency, its uncontrollable character, the occasionally contradictory relation of 'cause' and 'effect,' and the extreme facility with which it is induced; in expression and accompaniments it is identical.

BEARING OF THE PHENOMENA ON THE JAMES-LANGE HYPOTHESIS.

The theory of the emotions associated with the names of Dr. Carl Lange, of Denmark, and Dr. William James, of America, is too well known to require any elaboration or detailed mention in this place. Since, however, it seems to some extent to be misunderstood, or, at least, incorrectly applied, I have taken the opportunity of re-reading the originals in a recent convenient reprint.²⁵

According to Lange, emotion is the product of (1) a cause—a sensory impression which usually is modified by memory or a previous associated image, and (2) an effect—viz., vasomotor changes, which in their turn produce changes in bodily and mental functions. He asks, "What lies between these two factors, or does anything lie between them?" As is known his answer is that nothing lies between; the bodily phenomena are aroused immediately by the cause, so that the emotion consists exclusively of the functional disturbances of the body. "Take away the bodily symptoms from a frightened individual; let

his pulse beat calmly, his look be firm, his colour normal, his movements quick and sure, his speech strong, his thoughts clear, and what remains of his fear ? ” Whether a mental or a physical impression induces the reaction, the chief requisite for the formation of an emotional state remains the same for both, viz., the stimulation of the vasomotor centres. “ We owe all the emotional side of our mental life, our joys and sorrows, our happy and unhappy hours, to our vasomotor system. If the impressions which fall upon our senses did not possess the power of stimulating it, we would wander through life unsympathetic and passionless, all impressions of the outer world would only enrich our experience, increase our knowledge, but would arouse neither joy nor anger, would give us neither care nor fear.”

The views advanced so plausibly by James are not entirely identical. He does not postulate the intervention of stimulation of vasomotor centres, presumably those in the medulla, but rather holds that “ particular perceptions produce widespread bodily effects by a sort of immediate physical influence, antecedent to the arousal of an emotion or emotional idea.” One of his great arguments, as we know, is the purely speculative one of inability to picture an emotion without the consciousness of all the feelings of its characteristic bodily symptoms. “ What kind of an emotion of fear would be left if the feelings neither of quickened heart-beats nor of shallow breathing, neither of trembling lips nor of weakened limbs, neither of goose-flesh nor of visceral stirrings, were present, it is quite impossible to think. Can one fancy the state of rage and picture no ebullition of it in the chest, no flushing of the face, no dilatation of the nostrils, no clenching of the teeth, no impulse to vigorous action, but in their stead limp muscles, calm breathing, and a placid face ? ”

A third variant of the theory is that elaborated by Sergi,²⁶ who considers Lange’s views too restricted, and includes in the mechanism other medullary centres for organic life than the vasomotor, viz., the respiratory and the vegetative or sympathetic centres.

It will be seen that the hypothesis is, in a way, described with slight inaccuracy as the ‘ peripheral theory ’ of the emotions. Both Lange and Sergi assume the intervention of the bulbar centres *before* the peripheral elements are set in motion ; James, too, admits cortical activity *before* the periphery is reached by reflex currents. Yet all seem to be convinced that no emotion is felt in consciousness until the cortex is in its turn again reached, this time by visceral impressions. James, for example, gives the following *résumé* of his position : “ An object falls on a sense-organ and is apperceived by the appropriate cortical centre ; or else the latter, excited in some other way, gives rise to an idea of the same object. Quick as a flash, the reflex currents pass *down* [*italics mine*] through their preordained channels, alter the condition

of muscle, skin, and viscera; and these alterations, apperceived like the original object, in as many specific portions of the cortex, combine with it in consciousness and transform it from an object-simply-apprehended to an object-emotionally-felt."

Thus the first stimulus is ecto-peripheral, followed by an endo-peripheral stimulus, and emotions are not felt till the impression aroused by the latter reaches the cortex. But between these is an efferent impulse to the viscera and certain skeletal muscles, so that an in reality somewhat complicated degree of neural activity, both central and peripheral, must precede the arousing of the emotional feeling. A diagram from Kirchhoff²⁷ will render the idea more clear (*Fig. 8*).

Objections to the theory outlined above have been raised from different sides.

(1) Psychological difficulties have been emphasized by not a few who are competent to criticize. Sully,²⁸ for example, is convinced that the presence of an element of feeling at the very beginning of an emotional experience can sometimes be clearly observed. Pleasurable emotion can be started by 'agreeable sensations,' *via* eye and ear, and by the 'agreeable perceptions'

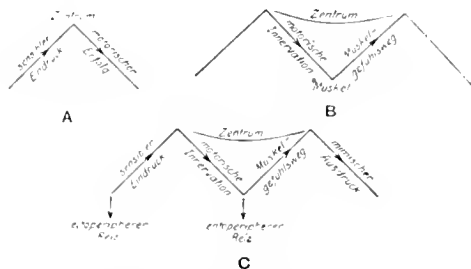


FIG. 8.—(Kirchhoff.)

- A. Ordinary reflex arc.
 B. The so-called reflex 'circle' of Bell.
 C. The reflex 'chain' for the expression of emotion.

which grow immediately out of these. When we laugh at some absurd incongruity in speech or manners "the perception which starts the laugh is an emotional perception," and "is flooded from the very first with the gladness of mirth." Further, once we are exhausted with laughing at a comedian we may be physically incapable of any further manifestation of emotional feeling, and yet we may still feel the full appeal of his funny stories, of his amusing antics. The objection has been raised by Störring²⁹ that Lange and those who agree with him reduce emotions and feelings to sensations, even though they be complex sensations of a particular kind. He maintains that emotions represent fusions of organic sensations and affective elements, and that it is impossible to peel away the mass of organic sensations from the total in such a way as to justify the statement that nothing is left. To enter at large into these and other psychological criticisms that have been offered is, however, outside the purpose of the present communication.

(2) Physiological objections have been formulated by Sherrington,³⁰ Cannon,³¹ and Bianchi,⁶⁰ among others.

Sherrington, it will be remembered, by appropriate experimentation, removed completely the sensibility of the viscera and of all the skin and muscles behind the shoulder in a number of dogs, yet this procedure resulted in no obvious diminution of an emotional character. "A mere remnant of all the non-projecting or affective senses was left, and yet emotion persisted." His conclusion is that organic and vascular reaction, though not the actual excitant of emotion, strengthens it. Cannon's researches have been devoted more particularly to an analysis of the visceral components of emotional states, and he has shown, in terror, rage, and intense elation, for instance, that the responses in the viscera "seem too uniform to offer a satisfactory means of distinguishing states which, in man at least, are very different in subjective quality." Since *various* strong emotions are expressed in the diffused activities of a *single* division of the autonomic system the bodily conditions which have been assumed, by some psychologists, to distinguish emotions from one another "must be sought for elsewhere than in the viscera."

(3) The argument from clinico-pathological cases is the one to which attention is here specially directed.

Consideration of the clinical examples cited somewhat briefly above, will show, as I believe conclusively, that in some instances at least the outward expression by no means corresponds to the patient's real feelings. It may be repeated that even though the emotional states of the cases are pathological, morbid, produced by disease, or what you will, they are in quality identical with normal emotions. Yet more than one patient has protested against the laughter or tears being taken as the index to his actual affective state. The conclusion, I suggest, is unmistakable, that the bodily reverberation, as James calls it, is not *per se* the emotion; the latter is not, so to speak, the mental symptom of the former. With all the outward appearances of mirth and hilarity, and, further, with concomitant activity of the visceral mechanisms in facial expression and respiratory movement, and, in addition, with simultaneous activity of visceral components, as witness rosy countenance and sparkling eye, the individual may not only not feel happy, but his state of mind may be in patent conflict with the apparent emotion. It is clear, therefore, that the James-Lange hypothesis must be materially modified if it is to be brought into line with observations such as have here been recorded. There can be in these pathological cases no complete fusion between the peripheral and the cerebral components. It is obvious that the emotional framework may be activated and come into full play without its afferent impulses being synthesized with the pre-existing mental state into a harmonious whole. The trigger is touched ever so lightly, and the neural pattern is released into exaggerated action: in spite of this, the patient may remain mentally detached, largely, if not always entirely, uninfluenced by the somatic and visceral

currents streaming centre-wards. From the standpoint of the clinician, therefore, I find myself in accord with the physiologist when he declares that "the reverberation from the trunk, limbs, and viscera counts for relatively little . . . as compared with the cerebral reverberation to which is adjunct the psychical component of the emotional reaction." Indeed, it might be said that some of my own and of the reported cases of others indicate the possibility of dissociation between the psychical and the physiological elements in the emotion.

Under normal conditions, practically all writers agree on the reinforcing and intensifying of the emotional cerebral state by the advent of somatic and visceral impulses (cf. Mott ³²), but our study of certain diseased conditions of organic origin must lead us to accept with caution the deductions as to the genesis of emotions made by the introspective method of the pure psychologist.

THE MECHANISM OF EMOTIONAL EXPRESSION.

In the expression of the emotions of joy and of sorrow, the only two with which we are here concerned, somatic and visceral factors are to be distinguished, though the latter, perhaps, are less in evidence or less intense in their activity than in other emotions that might be named. In the case of laughter there is, on the somatic side, involvement of facial and respiratory musculatures. It is unnecessary to describe the exact features of the former, familiar as it is to every one. As for the latter, the automatic rhythm of the respiratory centre in the medulla is rudely interrupted by prolonged inspirations, followed by short and broken expirations. Coupled with the respiratory movements are laughter sounds of laryngeal origin and of varying character and pitch. If the laughter is overwhelming, other muscles beyond those of face and respiratory apparatus will be implicated; in fact, there may be a good deal of diffused movement, even to the extent of rolling on the floor. For our purpose, however, attention need only be directed to face and chest. On the visceral side, capillaries and arterioles are dilated: the eyes sparkle and increased glandular secretion is observed; the skin reddens and glows.

In striking contrast, as far as the skeletal musculature is concerned, is the expression of sorrow: the facial movements of the latter are the reverse of those of laughter, while in respect of respiration there are short and interrupted inspiratory movements, succeeded by prolonged expirations—again the reverse of the other emotion. Further, there is a general inhibition, face and chest apart, of the rest of the voluntary musculature. On the visceral or vegetative side a degree of hypofunction results from a widespread vasoconstrictor effect, according to Lange, and is explanatory of the pale colour, sunken features, sensations of cold, lassitude, etc., that accompany sorrow.

Now the objective study of the facial and respiratory movements in the various types of case here dealt with is a *sine qua non* for the understanding of the difficult problems connected with the question of mimetic centres as opposed to centres for voluntary movement, and of the localization of the lesions producing the clinical phenomena under discussion. The no less important matter of the central representation of the visceral system is not at present, unfortunately, capable of the same objective examination.

A theoretical question not without practical bearing may be briefly touched on in passing. Which contributes more to the total emotional feeling in a normal or pathological case, the facial and respiratory movement, or the visceral activity? Or are their respective quotas approximately equal?

The evidence I wish to adduce is based on the investigation of a whole series of pathological cases in which free movement of the facial musculature is impeded by organic disease. It has been a routine matter in examination of such cases to inquire into the patient's feeling under the influence of appropriate stimuli. Among the material examined have been cases of facial diplegia, facial myopathy, myasthenia gravis, and of paralysis agitans and postencephalitic Parkinson's disease. The conclusion in each instance of bilateral facial impairment has been that the patient can readily feel and be acutely conscious of experiencing a particular emotional state such as that associated with hilarity and joy in spite of the minimal expression in the face. Moreover, the facial element may, as in the case of the 'snarling smile' of myasthenia, be a positive distortion of the normal movement, yet the feeling is in no degree lessened or altered. A facial diplegic, as one has often seen, may preserve a mask-like countenance and yet be moved by 'inward' laughter. Romberg,³³ for example, mentions the complete absence of expressional movement in one of his cases of facial diplegia, and says the patient "was very sensitive on this point, and termed it his greatest misfortune that he was forced to be joyful or sad without making any demonstration of his feelings to his fellow creatures." Similarly, Sir Charles Bell quotes a case from Dupuytren's clinique, that of a girl of sixteen, with facial diplegia, whose countenance bore a serious character, contrasting forcibly with her frame of mind; "she retained her good humour and sometimes laughed heartily . . . as if behind a mask, her face being quite immoveable and grave, whilst the emotion and sound of laughter prevailed."

From cases of this kind it may legitimately be argued that the time-worn controversy as to the actor's feeling the emotional quality of his part by assuming a suitable facial expression can be dismissed in a few words. An artificial assumption of an emotional facies is practically a negligible element; only when the psychological component is

fused with the appropriate visceral component can emotion be felt acutely, and the latter is less significant than the former: mere portrayal of an emotion may deceive the audience, but never the actor himself.* A little acquaintance with the observed facts of clinical neurology serves to emphasize the inaccuracy of the idea which Edgar Allan Poe³⁴ puts in the mouth of one of his characters: "When I wish to find out how wise, or how stupid, or how good, or how wicked is any one, or what are his thoughts at the moment, I fashion the expression of my face as accurately as possible in accordance with the expression of his, and then wait to see what thoughts or sentiments arise in my mind or heart, as if to match or correspond with the expression."

SOME THEORIES* OF THE MOTOR PHENOMENA.

Clinical study reveals the existence of three types of interrelated motor disorder in connection with emotional facial movement.

1. In the ordinary case of organic hemiplegia, the face on one side is paresed or paralysed for voluntary movement, but not for emotional expression: in other words, there is volitional asymmetry, but involuntary symmetry. Careful examination sometimes shows that three, rather than two, stages can be distinguished; thus we may observe (*a*) volitional asymmetry: (*b*) at the commencement of emotional movement, as in smiling, there may be involuntary asymmetry, the sound side moving before the other: (*c*) when, however, laughing is well established the stage of involuntary symmetry is reached.

2. In the ordinary case of double hemiplegia, or of pseudobulbar palsy, we meet with a condition of affairs as in (1) above, except that the voluntary paresis or paralysis is bilateral.

3. The third group is constituted by the class of case referred to at the outset, where voluntary control is perfect, while emotional facial expression is unilaterally paresed or paralysed; in other words, the condition is one of volitional symmetry and involuntary asymmetry.

An explanation that is sometimes given for the phenomena as observable in cases belonging to the first group is that physiological couples are not as a rule separated by unilateral disease; that is to say, the facial musculature of the two sides acts normally, in emotional expression, as a physiological couple, and is presumably represented bilaterally in the cerebral cortex, or wherever it be; hence unilateral lesions underlying hemiplegia will not throw out one-half of the pair. This view, known as Broadbent's hypothesis, is supposed to give an apt explanation of the relative conservation of voluntary movement in the upper face, as opposed to the lower, in hemiplegia, and has been widely

* This was admirably exemplified in a charming *lever de rideau* entitled *A Touch of Truth*, which preceded the popular *Bunty Pulls the Strings* at the Haymarket Theatre during the greater part of the latter's long run in 1911.

applied in other directions, mainly, of course, in reference to *volitional* action. Its original formula ³⁵ is as follows: "where the muscles of the corresponding parts on opposite sides of the body constantly act in concert, and act independently, either not at all, or with difficulty, the nerve-nuclei of these muscles are so connected by commissural fibres as to be *pro tanto* a single nucleus. This combined nucleus will have a set of fibres from each corpus striatum [read, cerebral cortex] and will usually be called into action by both, but it will be capable of being excited by either singly, more or less completely according as the commissural connection between the two halves is more or less perfect."

The application of this theory to the matter of conservation of mimic expression (a *non-volitional* movement) in unilateral facial hemiplegia may be criticized on the ground that it is going beyond Broadbent's original contention, but the criticism is not valid.

Consideration of the cases of the other groups, however, has naturally led to the development of the idea that there are separate and distinct paths for emotional and for volitional facial movement.

1. As long ago as 1865 it was pointed out by Saunders ³⁶ that the facial muscles have three distinct modes of action: as respiratory muscles, reflex: as muscles of expression, emotional; and as voluntary muscles in the strict sense. He postulated in the peripheral trunk of the seventh a distinct set of fibres for each of these different kinds of action, each connected independently with different excitator centres, so that one might cease to function through disease, but not the others. Long before him, Sir Charles Bell, as already remarked, had noted the different types of activity, and had offered an explanation that is not, perhaps, very clear. Bell ³⁷ says in one place: "We must determine whether even the *portio dura* of the seventh nerve may not lose one faculty and retain another. I suspect that the influence of passion, as those of smiling or laughing, is lost in consequence of affections that do not destroy the entire power of the nerve." Elsewhere he declares that: "We really have no reason to conclude that the one property of a nerve requires a finer organization than another. I should rather suppose that this power of expression is constituted with a finer relation to the condition of the mind and of the body; and, therefore, we may suppose is more easily affected by slighter derangements."

Bell's view is probably not incorrectly described as a theory ascribing differences in function to *differences in degree of affection* of the seventh, and in this respect is classifiable, with that of Saunders, as a peripheral theory.

The hypothesis is certainly untenable. If the trunk of the facial nerve is peripherally involved, it is involved for all modes of activity without any doubt. The only exception, or apparent exception, that I know of is that furnished by a case recorded by Spiller.³⁸ He has

observed in some instances of pressure on the facial nerve from extra-cerebellar tumours that emotional expression may be more impaired on the affected side than volitional expression. This he considers indicative of "a certain stage of peripheral facial palsy," but he admits that "the impairment of facial emotional movement may result, in part at least, from the pressure of the tumour upon the medulla oblongata and pons." A converse condition seems to have been observed by Monrad-Krohn,³⁹ who says that "in some few cases of peripheral facial paresis one may once in a while find a faint suggestion of this dissociation, inasmuch as the emotional innervation seems to result in a slightly *stronger* [italics mine] movement than the voluntary innervation."

Since my acquaintance with Spiller's article, frequent examination of analogous cases has failed to reveal any instance corroborating the observation. It must be remarked, moreover, that as regards both Spiller's and Monrad-Krohn's cases the difference is one of slight degree only between voluntary and involuntary innervation, not one of preservation and loss respectively, or *vice versa*. The problem, it may therefore be taken, bears rather on the possibility of separate, central, paths for the two main varieties of facial action; in Sherrington's terminology, separate 'private paths' converging on a 'final common path.'

2. In 1879 Nothnagel,¹ influenced by the much older conceptions of Sir Charles Bell and of Romberg, assumed that the simplest way to explain the ordinary motor phenomena in single hemiplegia, where the face is unilaterally paralysed for voluntary but not for mimic movement, was to postulate the existence of a 'psychoreflex' facial path, distinct from the facial division of the pyramidal tract; he thought the optic thalamus and its connections with the cortex were situated on this 'psychoreflex' path, which in hemiplegia was unaffected. To explain the converse syndrome, viz., unilateral emotional paralysis with retention of voluntary control, he tentatively suggested that "perhaps in such cases there is a local lesion in the optic thalamus." This view, commonly referred to as Nothnagel's theory, has since been applied far and wide, but its pathological basis, by which alone it can finally be proved or disproved, has never been quite satisfactory. It must in fairness be recorded that Nothnagel himself did not go so far as to place 'mimetic centres' in the optic thalamus—the form in which the theory is usually expressed; his exact words, quoted above, indicate the uncertainty in his own mind as to the facts.

Cases of his own on which he subsequently relied⁴⁰ are anything but unequivocal. One was that of a man of twenty-four, with typical emotional palsy of the left face, voluntary movement being normal; there was also weakness of the left limbs, with considerable loss of sensibility, and with astereognosis. *Post-mortem*, the right optic thalamus was enlarged

by a tumour to twice the size of the left; in addition, however, the internal capsule was compressed, and a great part of it, posteriorly, as well as of the corona radiata leading to it, was softened. In a second case, with a similar facial syndrome, a glioma of the thalamus was discovered, but there is no report of the condition of the internal capsule.

Nothnagel's views have found support from Strümpell, Bruns, Beehterew,⁴¹ and many more, and have been repeated in successions of text-books. Cases supposedly buttressing them have been published by Nonne,¹⁷ Kirehloff,⁴² Raimann,⁴³ and others, yet not many of these will stand rigorous investigation. For example, Kirehloff localized in the median nucleus of the thalamus the hypothetical 'mimetic centre'; his patient was a man of fifty-six, with slight left hemiplegia; there was asymmetry on smiling, but in laughter the asymmetry disappeared. In spite of this, Kirehloff believed the case supported Nothnagel's theory, since an area of softening was found in the anterior and median part of the right optic thalamus; in addition, however, part of the genu of the capsule, the head of the caudate, and the upper third of the lenticular nucleus were softened. Nonne's case was that of a man of fifty-one, with a history of several strokes, in whom the combination of attacks of weeping and laughing with facial asymmetry on emotional movement occurred; a number of softenings were discovered at the autopsy, including one which implicated two-thirds of the right thalamus. A case of Raimann's is equally untrustworthy, because of the multiplicity of the lesions. The case published by Borst¹⁶ is also unsatisfactory, since right-sided athetosis and ataxia were combined with right 'psycho-facial paralysis': to account for the symptoms there was found a tumour of the third ventricle, compressing and invading the left thalamus, the left crus, and the upper half of the pons.

Hopeless as it is to disentangle specific mechanisms from widespread disorders of function entailed by equally widespread lesions, the general localization of the above-mentioned cases ought not to be ignored; a good example of 'involuntary crying' caused by a thalamic tumour has been recorded by Weisenburg and Guilfoyle.⁴⁴ On the other hand, one or two records may now be cited in which the thalamus has been (presumably) intact. In the Dupré-Devaux case of pronounced *rire et pleurer spasmodiques* a marked *état lacunaire* of each putamen was associated with softenings in the anterior limb of the left internal capsule, while the thalami were unaffected. Burzio's⁹ patient, a woman of twenty-four, suffered from severe left hemiplegia and from irresistible attacks of laughing; the lesion was a vast softening of the right lenticular nucleus, with involvement of the posterior limb of the capsule, while all its anterior limb fibres were degenerated; cortical softenings were also seen in right frontal and postcentral gyri. The thalamus was

apparently normal. Similar *rire spasmodique* in a case of disseminated sclerosis was attributed by Touche⁴⁵ to the presence of plaques in the anterior and posterior segments of both internal capsules, in lenticular nuclei, etc., but no change was detected in thalamus or regio sub-thalamica.

Once more, a considerable number of thalamic lesions are reported in the literature which have not been associated with symptoms such as are under discussion, and which need not here be particularized.

Vague and lacking in precision, therefore, as must apparently be the conclusions to be drawn from the data thus briefly sketched, the possible rôle of the thalamus, i.e., of some part of it, in the genesis of involuntary laughing and crying is not to be lightly dismissed, as we shall shortly see.

3. Another hypothesis was advanced by Brissaud² to account for the phenomena. According to him, integrity of the thalamus is

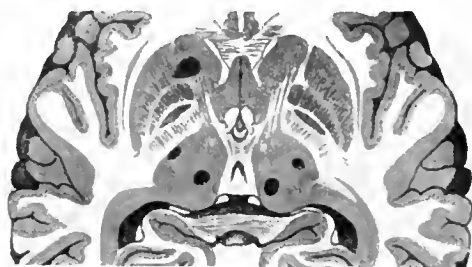


FIG. 9.—Lesions in Giannuli's case of *rire spasmodique*.

essential to the appearance of spasmodic laughter or weeping; the causative lesion is one involving the anterior limb of the internal capsule, in that part where he places his *foiſſeau psychique*, or frontothalamic tract of control over thalamic centres. One of his cases was that of a man of forty-eight, with right hemiplegia and complete aphasia: extremely marked uncontrollable weeping was an additional feature. *Post-mortem*, softenings were found in the left putamen, extending completely across the anterior segment of the internal capsule: symmetrical lesions were discovered in the right putamen, but these only touched the anterior limb of the capsule. Many small cortical lesions were also noted, though their exact position is not given. In the case recorded by Giannuli²⁰ and used by him to support Brissaud's hypothesis, there was a considerable softening in one anterior capsular limb, yet both thalami also were patently the seat of degenerative disease (*Fig. 9*)—in contradiction of Brissaud's contention, just mentioned, for integrity of the thalamus in spasmodic laughing and crying.

In his lectures on pseudobulbar paralysis Brissaud⁴⁶ appears to

place centres for involuntary expression of emotion in the basal ganglia ('noyaux opto-striés'), and to argue that the syndrome we are concerned with is a product of 'irritation': "il signifie toujours une irritation capsulaire" (anterior segment). He regards the phenomena as on a par with the tendency to spasm shown in any case of hemiplegia: "si les centres en question ne sont pas détruits mais simplement excités par une lésion de voisinage, ils traduisent le spasme hémiplégique en déchaînant le rire et le pleurer."

Notwithstanding its plausibility the hypothesis will not bear serious investigation. Apart from the primary objection to the view that the symptom is 'irritative' and not of the nature of a 'release-phenomenon,' Brissaud depends for support of his thesis on anatomical connections of the cortex with the corpus striatum and on anatomical views of the ansa lenticularis which have not been confirmed by subsequent investigation. The diagrams illustrating his article assume links in neuronic chains that remain to-day quite speculative from an anatomical standpoint.

Oppenheim,⁴⁷ who with Siemerling described exaggerated laughing and crying in pseudobulbar palsy in 1886, supposes it due to "lesions of the centres or interruption of the tracts which have an inhibitory effect upon the bulbar centres," without specifying further the exact position of one or the other. He states, moreover, that these facial movements may be affected in every possible way "according as the morbid foci have an irritating or a paralysing effect." It will be seen, we think, that here again the student is offered a theory which is more than a little nebulous.

4. Reference has been made above to the work of Hartmann⁴ on pseudobulbar paralysis. Arguing from the experiments of Bickel, who observed the 'explosive' character of voluntary movements in animals after the production of sensory ataxia by appropriate cortical lesions, Hartmann is inclined to regard the absence of centripetal impulses as a factor in the pathogenesis of the phenomena. He believes that a defect on the *afferent* side through the optic thalamus is responsible for the release of involuntary emotional activity. In this respect he is in agreement with von Monakow,⁴⁸ and, in a way, with Lewandowsky⁴⁹; the latter argues that peripheral sensibility has a much greater influence on mimic expression than on voluntary innervation of the facial musculature, and is led to suppose that since the optic thalamus is only a 'Schaltstation' of sensibility on the way to the cortex, and not an autonomous organ, lesions productive of amimia or of expressional overaction may be situated there, though they may not: they may also occur in the cortex or in subcortical fibre-systems. He is doubtful whether mimic reactions may be obtained at still lower levels.

The opinion expressed by Bechterew⁵⁰ is that the syndrome is dependent on two factors: (1) removal of voluntary control, and (2) the

influence of exaggerated involuntary stimuli. Unfortunately he has not vouchsafed the reader precise information as to how these come into action; quoting a personal case in which other symptoms than the involuntary *rire* and *pleurer* pointed to a pontine localization (no pathological confirmation), he expresses the view that the involvement of fibres passing from the optic thalamus to 'deeper lying centres' (not specified) allows the exaggeration of emotional display. In another communication he states, negatively, that *rire spasmodique* is certainly not due to implication of the voluntary paths to the facial muscles.

From these, and from other writings that might be cited but that do not call, perhaps, for any detailed reference, the student of the subject will appreciate the truth of Lewandowsky's final comment, that more exact observations are required, and that the hypotheses usually advanced are characterized by indefiniteness and absence of precision.

OUTLINE OF A SUGGESTED THEORY.

In order to aid understanding of a possible theory explaining both anímia and mimie overaction, it is desirable to indicate the way in which, as I conceive it, the subject should be approached.

1. Omitting in this place consideration of the visceral components of laughing and weeping, I think it imperative to note the participation of both facial and respiratory mechanisms in the act of laughter (or weeping), both physiological and pathological.

The physiological association of facial and respiratory musculatures in the expression of emotion scarcely calls for any comment, so obvious is it. Bell called the seventh the "facial nerve of respiration"; when the lower face (mouth and nose) is paralysed it was described by him as "paralysis of the respiratory functions of the facial." The implication of the face in sneezing, the facial spasms occurring with respiratory gasps *in extremis*, the collaboration of the facial apparatus with the other in ordinary breathing and speaking, are simple instances of the action of this important synkinesis. The seventh nerve is united functionally with the tenth, and also on occasion with the eleventh and certain upper cervical spinal groups. For simplicity's sake, we may allude to it as the faciorespiratory mechanism. We note that its normal activities are involuntary, i.e., it is under voluntary control only to a limited extent. Laughter may be 'stifled,' tears may be 'restrained,' no doubt; at any rate, practice may enable the individual to inhibit its function to a varying degree; ordinarily speaking, however, the faciorespiratory mechanism goes off 'on its own,' whether the circumstances be physiological or pathological.

The localization of the 'nœud' of this mechanism is still uncertain; we have to postulate a centre linking the seventh nucleus in the pons with the motor nucleus of the tenth (nucleus ambiguus) in the medulla

and the phrenic nuclei in the upper cervical cord, etc. By all analogies this 'centre' must be supranuclear; for the sake of argument we may suppose it has an upper pontine site.

2. Our second preliminary consideration is to bear in mind the existence and function of the respiratory centres proper, for ordinary automatic breathing, situated in the medulla. With their normal action must also be associated co-operation on the part of the larynx and the face, otherwise normal breathing might partake of the noisy character observed in various diseased conditions.

The most recent work on the localization of the respiratory centres is that of Lumsden,⁵¹ who has shown, by numerous experiments on cats, rabbits, dogs, and monkeys, the somewhat elaborate nature of the arrangements. Thus, he has demonstrated that ordinary rhythmical respiration—quiet, unconscious breathing—depends on several factors. There is (*a*) an inspiratory mechanism at the level of the striæ acousticae; this he calls the 'apneustic centre,' because when this group of nerve cells is cut off from above, prolonged tonic contraction of the inspiratory muscles ensues ('apneusis'). The level of the striæ acousticae is upper medullary. (*b*) Just below this there is a separate expiratory centre (medullary), the existence of which has long been suspected and is now apparently established. (*c*) Both (*a*) and (*b*) are controlled by a higher centre in the upper half of the pons, styled by Lumsden the 'pneumotaxic' centre, because it regulates normal quiet breathing. When it is cut off from (*a*) by appropriate section, respiration takes the form of a series of prolonged inspirations, each followed by two or three relatively quick respirations of abnormal type. Lumsden has shown that this cycle repeats itself with great regularity. Evidently, then, the pneumotaxic centre produces normal respiration by inhibiting the activity of the apneustic centre below (behind) it. (*d*) A fourth, 'gaspings,' centre, situated below (*b*) at the level of the apex of the calamus scriptorius, is regarded by Lumsden as a 'relie,' and need not further concern us.

No mention is made by this writer of the position on transverse section of the various groups and tracts the functions of which he has so excellently demonstrated, nor is there any allusion to concomitant implication of the face in respect of the activity of the pneumotaxic centre—not that this, perhaps, was to be expected. It is therefore impossible, without further investigation, to say what relation, if any, there may be between the pneumotaxic centre of Lumsden and the postulated co-ordinating centre for the faciorespiratory mechanism referred to above.

3. Our next consideration bears on the influence of voluntary action on the respiratory centre in the pontomedullary apparatus. Its automatic activity is set aside *voluntarily* when we deliberately hold our breath, or when we voluntarily pant, cough, yawn, sigh, take deep

breaths, etc. Further, its activity is set aside *involuntarily* when we are convulsed with laughter, or when we give way to crying, sobbing, howling. Both in the former and the latter case facial movement is involved; we innervate the facial musculature *voluntarily* for the purposes specified, and the face takes its share in the *involuntary* expression of joy or sorrow.

Thus we get the idea of a *double control* over the faciorespiratory synkinesis: (a) a voluntary control when we choose to inhibit automatic movement, and (b) an involuntary control when that automatic movement is forced to give way to the expression of emotion.

(1) *Voluntary Control*.—The path followed by volitional impulses to facial and respiratory muscles is undoubtedly the familiar corticopontine, corticobulbar, and corticospinal tract. In particular, the geniculate bundle of the pyramidal tract, from the operculum and lower end of the precentral gyrus, *viâ* the genu of the internal capsule, conveys these impulses to the appropriate nuclei. As we have seen, voluntary breathing sets aside ordinary breathing, hence we must postulate, on the principle of reciprocal innervation, a synchronous inhibition of the automatic pontobulbar centre. The anatomical course taken by the latter, inhibitory, impulses is less certain, but of their reality there can be no question. It will be remembered that Hughlings Jackson⁵² explained the interesting observation he made on respiratory movement in hemiplegia by the existence of double sets of respiratory fibres passing from the brain in this way.

Lesions, therefore, of the geniculate bundle anywhere in its course—especially if they are bilateral—will impair volitional control over the musculatures concerned in the expression of emotion, with the result that the involuntary action of the same mechanisms will tend to become abnormal. Pseudobulbar paralysis is the disease of the geniculate bundles which, we have already seen, is particularly prone to be accompanied by the phenomena of *rire et pleurer spasmodiques*. If the reader will refer again to case 3 above he will note there was *absolute* voluntary paralysis of face and of respiratory apparatus—hence emotional seizure of the same parts was entirely unchecked, and the patient's existence was one long roar of laughter. An old observation recorded by Magnus,⁵³ in 1837, presents certain analogies to my case 3, and may be briefly outlined. The patient was a widow of fifty who had had two 'strokes,' with the result that there was *complete* bilateral paralysis of the face and tongue; yet she smiled and laughed, often violently, the paroxysmal laughter ending in a peculiar, grunting sound of which she was ashamed, and which she would willingly have suppressed; it continued, however, even after the movements of laughter had ceased.

It is clear, then, that the more absolute the faciorespiratory paralysis, the more exaggerated is the involuntary innervation of the same

mechanism. In this connection Monrad-Krohn has shown that the emotional innervation is often distinctly exaggerated on the paretic side in hemiplegia, and has proved (by the 'slow-motion' cinematographic camera) that emotional movement is actually quicker on the side showing voluntary paresis. On the other hand, for the exhibition of 'uncontrollable' laughter or tears a degree of volitional paresis or paralysis is not quite essential, though it is certainly usual; the involuntary action of a normal laugh may break down normal control; the quivering lip of the child is indicative of a balance between the action of the voluntary and the involuntary processes which may be tipped over in either direction by a trifle.

(2) *Involuntary Control.*—The careful experiments of W. G.

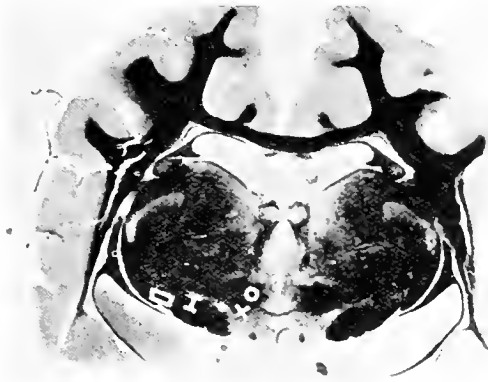


FIG. 10.—(Spencer.)

O = position of respiratory path, stimulation of which produces slowing and arrest.
X = ditto, stimulation causing acceleration. These are extrapyramidal tracts.

Spencer,⁵⁴ in 1894, determined the existence of four paths from the cerebral cortex to the respiratory mechanism. Of these, one is undoubtedly the voluntary path just mentioned, from the motor cortex *viâ* the genu of the capsule; its stimulation produces, in the ape, a sort of 'holding the breath,' or, as Spencer calls it, "overinspiratory toms." Two of the other tracts follow an entirely different course; one is an 'arresting' and the other an 'accelerating' path. The former arises from the under surface of the frontal lobe, the latter from the sensory cortex. Spencer has traced the two throughout their course; they come together towards the middle line at the mesial aspect of the lower optic thalamus, bordering on the third ventricle, and run down, near the midline of the tegmentum, to the medulla. Both are far removed from the voluntary tract for respiratory innervation in the capsule and crus. More exactly, the route followed by the arresting path is from a spot on the under surface of the frontal lobe where the olfactory tract runs into

the temporosphenoidal lobe, along the 'olfactory limb' of the anterior commissure (where it decussates), by the side of the infundibulum, past the nucleus ruber below and external to the aqueduct in the plane of exit of the third nerve, and so to the medulla. As for acceleration, "commencing especially from a point on the convex surface of the cortex within the sensorimotor area, the effect may be followed back through the lenticular nucleus where it borders on the outer and ventral portion of the internal capsule; the strand runs at first externally and then ventrally to the motor portion of the internal capsule, and so reaches the tegmentum. The lines from the two sides meet in the interpeduncular grey matter at the level of and just behind the plane of the third nerves."

The figures reproducing Spencer's photographs (*Figs. 10 and 11*)



FIG. 11.—(Spencer.)

O and X as in Fig. 10. Note the distinction of these paths from the respiratory tracts in the crus (indicated by \square and \boxplus).

indicate the position of the arresting and accelerating respiratory paths and show their distinction from the voluntary tract for respiratory innervation in the capsule and crus.

I believe it is a feasible speculation that these are the paths for emotional activation of the faciorespiratory mechanism. They are separate from the paths for voluntary control; they come towards the midline in the regio subthalamica and tegmentum; stimulation of them produces unvaryingly the phenomena of arrest and acceleration noted above. As far as the respiratory element in involuntary laughing and crying is concerned their appropriate excitation and inhibition will explain the mainly expiratory character of the former and the mainly inspiratory character of the latter.

Clinical proof of the reality of the faciorespiratory involuntary synkinesis, and of the possibility of its unilateral paralysis, is furnished

by Stromeyer's remarkable case, already mentioned. It remains to ascertain if we have any experimental evidence bearing on the association of the face with involuntary respiratory tracts. In a valuable paper⁵⁵ entitled 'Note on the Physiology of the Basal Ganglia and Midbrain of the Anthropoid Ape, especially in reference to the act of Laughter,' Graham Brown has given us certain data that bear on our subject. He has demonstrated in the normal animal that tickling in the hollow of the shoulders, armpit, etc., causes the chimpanzee to respond by retraction of the lips, as in smiling, while, at the same time, the respiration becomes more rapid and slightly vocal. "The sound given is that of 'Ha, Ha, Ha,' but not said as we say it—rather whispered. There can be little doubt that this reaction to tickling is equivalent to the act of laughter." *

The same investigator, working on the exposed surface of the mesencephalon after transection, has found that between the internal boundary of the red nucleus and the mid-longitudinal dorsiventral plane of the neuraxis there is a small and very strictly circumscribed area, not much more than 1 mm. across, unipolar stimulation of which suddenly changes the normal slow, deep, and steady respiration to fast and shallow breathing (Fig. 12). The abdominal muscles of both sides of the body appear actively to contract and relax during the reaction, which stops always with cessation of stimulation. Graham Brown says specifically that "the sound of this breathing was very similar to the 'Ha, Ha, Ha' of the laughing chimpanzee." In a personal communication he states that to the best of his recollection the facial muscles were retracted at the mouth at the same time.

Here, then, though there is some slight uncertainty, it would appear that stimulation of a specific descending tract in the mesencephalon causes the animal to make both the facial and the respiratory movements of laughing, apart altogether from the corticobulbar pathways. Graham Brown has also found within the extreme caudal end of the optic thalamus two spots, of which stimulation applied to the dorsal one causes

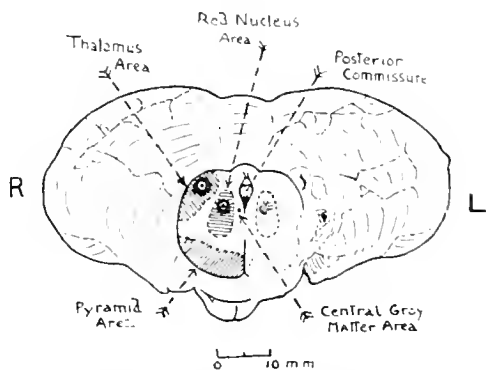


FIG. 12.—(Graham Brown.) Stimulation of the spot indicated as 'central grey matter area' produces a modification of the chimpanzee's breathing closely akin to 'laughing.'

* There is a fine photograph of a 'laughing' chimpanzee on page 92 in Crile's book on the Emotions (see reference 23).

very vigorous and 'hollow' breathing, while excitation of the ventral spot gives a slowing of respiration.

A comparison of the results obtained by Spencer and by Graham Brown shows, as far as the mesencephalon and tegmentum are concerned, the existence of resemblances in anatomical position and in objective phenomena sufficiently impressive to outweigh such discrepancies as still remain. Their correlation with the work of Lumsden is difficult, as already hinted, because of the absence in the latter's experiments of evidence pointing to a particular localization on transverse section at the level of the upper pons.

Our general conclusion may be couched in the following terms: there are corticofugal paths to the faciorespiratory centres in the pons and medulla that are independent of the voluntary cortico-ponto-bulbar tracts to the same nuclei: on excitation they will either arrest or accelerate, i.e., interfere with, the normal rhythmic activity of the respiratory centre: the available evidence warrants the speculation that they are the routes taken by emotional impulses to modify the faciorespiratory synkinesis in the direction either of laughter or the reverse. Their exact course remains for further substantiation; it is perhaps noteworthy that they make their way separately towards the midline skirting the lower optic thalamus (in the case of one) and passing by the lower regio subthalamica to the tegmentum, and so to more caudal levels of the neuraxis.

APPLICATION TO DISEASED CONDITIONS.

1. Pathological laughing and crying are allowed by lesions of the voluntary paths from the motor areas of the cortex or by any state in which these exercise imperfect control. Laughing and crying then become 'uncontrollable.' Their common appearance in pseudobulbar paralysis is readily understood, because of the usual volitional facial, etc., weakness.

It must, however, be pointed out at once that this is not a complete explanation of the facts. Some cases of bilateral facial weakness of central origin are not particularly prone to develop the exaggerated emotional display of which we are speaking, while it may appear in other diseases in which bilateral voluntary control is not in any way impaired, or not obviously impaired, by the morbid state. In the case of the former it is likely either that the individual is not by constitution particularly 'emotional,' or that voluntary control, though impaired, is still adequate, or that, possibly, disease is affecting the activity of the non-voluntary paths as well as of the voluntary. In this connection Féré's case of 'fou rire prodromique,' referred to above, is of interest in view of the cessation of the uncontrollable laughter subsequent to the development of a severe left hemiplegia. It would have been of value to ascertain

the position of the lesion or lesions which thus caused the emotional exhibition to stop.

In the case of the latter—as, indeed, in normal persons—the emotional stimuli evidently overwhelm the control mechanism, and we must suppose either an irresistible quality in them, heightened by disease, or a constitutional peculiarity on the part of the individual—disease apart, or defect of cortical control not discoverable in tests for volitional facial innervation, or, perhaps, defect on the afferent side to the cortical emotional ‘centres’ from which the faciorespiratory paths arise.

2. The reverse condition, unilateral (or bilateral) emotional palsy, is brought about by a lesion of the appropriate involuntary system whose possible course has already been indicated, the voluntary cortico-ponto-bulbar tract being normal. *Ex hypothesi*, this may occur anywhere from the cortex to at least as low as the pons.

For example, the clinical evidence in my case 8 is strongly suggestive of a lesion in the mesencephalon (paralysis of upward and downward conjugate movement of the eyes, unilateral Argyll Robertson pupil, hemitremor) under the anterior corpora quadrigemina. The patient showed unilateral, right, emotional facial palsy. Similarly, in case 9, a tumour of the mesencephalon was in a position to effect unilateral ‘mimic’ paralysis (see *Figs. 5 and 6*). The remarkable instance of the same condition recorded by Mills¹⁵ was associated with various other symptoms and signs, and was due to a destructive lesion involving, *inter alia*, the mesencephalon. Allusion has already been made to the occurrence of the paralysis in cases in which the thalamus, speaking loosely, has been implicated. If the hypothesis advanced in this communication is trustworthy, the condition should not occur in all thalamic cases by any means, but only in those where the lesion is so placed as to engage the tracts specified.

We have seen they do not pass right through the thalamus—at least in the case of the arresting path—but rather skirt it mesially and ventrally. The argument, therefore, opposing Notlmagel’s original speculation on the ground of the occurrence of negative thalamic cases loses much of its value. The lesion causing mimic palsy does not occupy the same site as that causing the thalamic syndrome—an explanation which has suggested itself to Gordon Holmes⁵⁶ and others, and which is borne out by the considerations here advanced. The two, however, may doubtless be combined, though no definite instance has as yet come under my notice.

Ex hypothesi, further, mimic paralysis may originate in a cortical lesion, but, so far as I have seen, no such case has yet been recorded. Pathological investigation of all cases exhibiting mimic palsy is a *desideratum*.

The possibility of a combination of (1) and (2), viz., the occurrence

of facial asymmetry in uncontrollable laughter, is realized in case 3 above, in which, with highly characteristic *rire spasmodique*, the angle of the mouth was not retracted so well on the left side as on the right : a similar combination was observed in the case reported by Nonne.¹⁷

It is of particular interest to note the general grouping of the cases of involuntary, mimie, paralysis discussed above (cases 3, 7, 8, 9, Mills' case) in relation to the distribution of the posterior communicating artery. Beevor has shown that this vessel supplies the anterior third of the crusta, and all the part between it and the third ventricle at the midline ; frequently, too, it irrigates the anterior half of the internal nucleus of the optic thalamus. Now we have seen that the respiratory tracts discovered by Spencer come together within this area ; hence a lesion in the distribution of the posterior communicating artery may be regarded as likely to exteriorize itself, *inter alia*, by unilateral mimie paralysis. The explanation given by Beevor for the phenomena of his striking case rests on a different interpretation from my own ; he thinks Spencer's respiratory arresting and accelerating paths are those of *volitional* control, and that their involvement caused the paralysis of voluntary respiration in his patient. With this view I am not in accord, as will have been seen ; I believe, however, their partial implication explains the incomplete mimie paralysis which his case certainly exhibited.

From the argument here advanced it will be gathered that any hypothesis for the placing of actual 'mimetic centres' in the thalamus is unnecessary. The thalamus cannot be more than a link in the chain—if, indeed, it is actually as much. The afferent paths for appropriate impulses from eye, ear, skin (tickling), etc., lead through the thalamus to the cortex. The laughter-producing stimulus is cortically appreciated, and its expression through the involuntary faiorespiratory mechanism is mediated, *ex hypothesi*, by the efferent arresting or accelerating tracts already described. The arresting tract in its descent skirts, or perhaps runs through, the lower mesial margin of the thalamus—the palæo-thalamus, be it noted, which borders on the third ventricle, and which, according to Tilney and Riley,⁵⁷ "seems to be invested with a functional responsibility related to the development of the emotions and the emotive expressions." On the afferent side neuronal systems are relayed in the thalamus, but it is not certain if the same obtains on the efferent side, hence the possibility of a 'short-circuit' from sensory to motor path in that ganglion itself remains undecided. Whether such a short-circuit would explain the 'explosive' character of spasmodic laughing and crying, the exaggerated response to trifling emotional stimuli, is equally uncertain. The argument from the pseudobulbar cases is that some defect of volitional faiorespiratory control heightens the facility of the explosive phenomena, yet, as we have seen, it is not always *per se* sufficient. It is conceivable, therefore, as some have maintained, that

failure of corticothalamic inhibition is responsible for undue 'liveliness' of the thalamus, and for the exhibition of involuntary emotional exaggeration.

For myself, however, I am of the opinion there is more to be said for the participation of the cortex in the production of abnormal emotional activity. We cannot take it that the cortical origins of the arresting and accelerating respiratory tracts of Spence are physiologically, though anatomically, separate, and we may ask—using Mills' expression—where is the rendezvous? In an ingeniously developed argument, that veteran neurologist^{58,59} contends that in the right hemisphere mainly, in the midfrontal region, are centres for the representation of movements especially concerned with the expression of emotion. He gives the term 'movement' a broad significance, as applying both to skeletal and to visceral, vascular, and secretory activity. On the other hand, Bianchi,⁶⁰ whose claim to speak with authority also is acknowledged, declares that "to maintain that the frontal lobe plays a part in the essence and mechanism of the emotions . . . is a bold hypothesis in which there is a good deal of mere conjecture and certainly no basis of proof."

Be all this as it may, and however much in the matter is still obscure, our facts have led us to suggest that there are corticofugal paths for the expression of the emotions *via* the faciorespiratory apparatus, distinct from those for voluntary innervation of the same nuclei, and as a necessary corollary we presume the existence of a cortical nodal point co-ordinating them. Its situation is at present indeterminate, yet it is likely to have some definite position. In this connection I echo with approval the words of Mills, who declares he is not one of those who believe that the problem of emotion, or of any other great mental process, is to be explained by regarding it in some vague way as a complex expression of the action of the cerebral cortex as a whole.

There is clinico-pathological, and experimental, evidence suggesting that non-volitional control over the normal activity of the faciorespiratory mechanism is exercised from the cortex by routes that pass separately downwards to come together towards the midline in the regio subthalamica and tegmentum.

It is not certain that these actually pass through the thalamus in man, though it is understandable that some thalamic lesions may be so placed in that ganglion as to interfere with them as a vicinity effect.

We have no information as yet to show these paths are interrupted by a thalamic relay, nor is it known that emotional impulses can pass from sensory to motor side at this level; it is possible, perhaps, but not probable.

It is outside my immediate purpose to deal at any length with certain modifications of the act of laughter or of crying due to sensory,

ataxic, and spastic conditions as affecting the musculatures involved in the emotional performance. Neurologists have occasion, every now and then, to observe cases in which laughter is mainly inspiratory, or 'hollow,' or 'noiseless,' others in which it is prolonged by rigidity of the facial muscles (as in some cases of progressive lenticular degeneration, paralysis agitans, etc.)—the so-called 'spastic smile'—and others in which an obvious element of ataxia or dysmetria is introduced. The laughter of cerebellar patients, of those with Friedreich's disease, etc., not infrequently assumes a peculiar character. As any motor mechanism may be impaired by defect on the sensory or the cerebellar side, so may that concerned in involuntary emotional expression. This part of the subject, however, is quite subsidiary to the main problem here discussed, and must for the present be left aside.

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THE DEVELOPMENT OF PSYCHOPATHOLOGY AS A BRANCH OF SCIENCE.

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THE aim of this paper is to describe, in summary fashion, the history of psychopathology as a branch of science, and to consider how far it has succeeded in establishing its claim to an assured position within the fold of science.

The extent and boundaries of the path we desire to traverse will be made clearer if some preliminary words are devoted to the precise meaning of the terms in which the subject of inquiry has been defined. Psychopathology is to be understood, not as a mere description of mental symptoms, but as an endeavour to *explain* disorder or certain disorders in terms of psychological processes. Its difference from a mere description of mental symptoms is of the same order as that which exists between clinical medicine and that explanation of the phenomena of clinical medicine in terms of causal processes which constitutes pathology. 'Explain' is used here in the sense in which it constitutes the goal of the method of science. Science is not a compilation of facts, but a method of dealing with our experience. It consists in (1) the recording and classification of phenomenal experience, (2) the finding of formulæ which will serve to resume that experience. This latter part involves the construction of concepts or 'laws,' which will embrace the phenomena we have observed, and enable us to predict the occurrence of further phenomena, the validity of the 'law' being tested by its capacity to fulfil these two conditions. The function of the scientific law and its relationship to the phenomena with which it is concerned may be exemplified by chemical phenomena and the atomic theory, physical phenomena and the law of gravitation, the phenomena of light and heat and the æther theory. It should be observed that these laws are not found or observed by the investigator; they are constructed by him to explain what he has found or observed. The aim of science is to understand and control our phenomenal experience, and the validity of the concepts it constructs is determined by the extent to which they satisfy this aim. Each branch of science claims the right to construct its own concepts, provided that they are constructed according to the rules of scientific method.

That portion of our experience which is constituted by the behaviour

of living organisms has been attacked by several branches of science, each regarding the phenomena from its own standpoint, and interpreting them in terms of its own concepts. Biology, for example, interprets the phenomena of living organisms in terms of life-process and biological laws, physiology in terms of nervous energy, reflex action, and so forth, chemistry in terms of the interaction of chemical compounds. Some of the phenomena are capable of explanation by the concepts of more than one branch of science, some can be more intelligibly and usefully explained by the concepts of one branch than by those of another, some are at present capable of explanation by the concepts of one branch only. The hope is always before us that the concepts of one branch may ultimately be reduced to the concepts of another, especially when the latter are concepts of a wider validity. There is a reasonable hope, for example, that the concepts of nervous energy and reflex action may ultimately be reduced to the wider concepts of chemistry and physics. But, to a large extent, such a reduction is a goal of the future, and, for the present, each branch must be content to explain whatever phenomena it can in terms of its own concepts, having always in view the essential aim of all science—the understanding and control of our experience by the fashioning of scientifically constructed ‘laws.’

Can psychology claim a place as one of the branches of science capable of usefully explaining the phenomena of living organisms? For a long time this claim was denied, and psychology was treated as an alien with no right of entry into the fold of science, because it dealt with non-material and non-spatial objects, which the crude philosophy of the nineteenth century scientist regarded as necessarily incapable of scientific treatment, and even as ‘epiphenomenal’ and unreal. So soon as it was realized, however, that science is not defined by the nature of the objects with which it deals, but by the method of investigation applied to those objects, and that its field comprises the whole field of our experience, then the right of psychology to contribute its quota to the explanation of the phenomena presented by living organisms could no longer be gainsaid. Moreover, psychology could claim the right to interpret the phenomena in psychological terms, and to construct psychological concepts in order to explain those phenomena. The only condition, but one rigidly to be observed, was that the concepts must be constructed according to the method of science, that is to say, they must be based on carefully observed experience, they must serve to resume that experience, and they must be verifiable by an appeal to experience.

How far psychology has attempted to carry out this task in the elucidation of certain disorders of the human organism, how far it has succeeded, and what limitations have been found to beset its path, these are the problems which form the subject of this paper.

There are certain disorders in which the clinical phenomena have a dominantly psychological character, and are only capable of being adequately described in psychological terms. These are the psychoses, comprising the various types of insanity. This sphere would seem to be the most obvious one to attack by a psychological method, and it might have been thought that psychopathology would have found here its most suitable material, and its best chance of successful results. Actually, however, the historical development of psychopathology has taken a different road. The first great advances were made in a field where the most prominent phenomena were not mental at all, the field of hysteria, with its anæsthesias, paralyses, and other disturbances of an apparently physical kind. Physiology had previously attempted to explain hysteria by its conception of 'functional nervous disorder,' but this conception failed to satisfy the canons by which every scientific conception must stand or fall. It was not based on observed experience, but merely on a theoretical assumption designed to bring hysteria into line with organic diseases. It did not enable the investigator to understand the phenomena with which he had to deal, it did not enable him to predict their course and occurrence nor to control their course and occurrence, and it could not be verified by any appeal to experience. It was, in fact, useless, in the sense that a scientific conception, being a weapon with which we hope to achieve an end, is useless if it does not help us towards that end. The way was clear, therefore, for a fresh attempt to explain hysteria, and the foundation of a psychopathological conception was laid by Chareot, when he proposed the view that certain hysterical phenomena were due to 'ideas.' The avenue thus opened was explored by one of Chareot's pupils, Pierre Janet. He investigated the various phenomena of hysteria, and found that they were capable of being interpreted in precise psychological terms, and, finally, he succeeded in formulating a conception which served to explain, in part at any rate, the nature of those phenomena. This conception will be best understood by describing the steps of Janet's researches with regard to one group of hysterical phenomena, functional anæsthesia, and we shall do this in some detail, because it provides an excellent example of the employment by psychopathology of a method which conforms strictly to the method of science. In the first place, it was found that the anæsthesias, although they did not correspond in their distribution to the distribution of any section of the nervous system, did have a distribution which corresponded to something. The familiar glove anæsthesias, for example, ending in sharp lines at the level of the wrist, had a distribution inexplicable by any lesion of the nervous system, but their distribution corresponded precisely to the patient's idea of his own hand. That is to say, the incidence of the symptom was plainly determined by a factor of a psychological order, and it would, therefore, be profitable to

seek for a psychological conception in order to explain it. Secondly, these anæsthesias exhibited a curious paradoxical character. Patients suffering from extensive anæsthesias involving a whole limb or half the body rarely appeared to sustain any accidental injury to the anæsthetic part, whereas in patients with relatively far smaller organic anæsthesias, syringomyelias for example, such injuries frequently occurred. It would seem, indeed, that the hysterical patient must be able to feel with his anæsthetic limb in order to evade the accidents which would otherwise inevitably befall it. Similarly, patients with hysterical amblyopia of such a degree that the field of vision was reduced to a single point were able to play at ball, a performance obviously impossible unless the greater part of the retina were capable of receiving visual impressions. This paradoxical character was, perhaps, exemplified most clearly by the case of a boy who, after being in a fire, developed hysterical phenomena consisting on the one hand in the occurrence of hysterical fits whenever the patient saw a flame, and on the other hand in an amblyopia whereby the visual field was restricted to 30 degrees. If the boy were tested with a perimeter he was unable to see the paper disc until it had travelled along the perimeter arm to the 30-degree radius. If, however, a lighted match were substituted for the disc of paper, then immediately it reached the limits of normal vision a fit occurred. Quite clearly, therefore, the patient was able to see over the whole field of normal vision, and equally clearly, he was blind to everything outside 30 degrees.

The conception which Janet constructed to explain these phenomena was the conception of 'dissociation of consciousness.' He presumed that consciousness, instead of pursuing its course as a single homogeneous stream, was capable of being split into two or more independent currents, so that the consciousness belonging to one current would be unaware of, and unable to control, that belonging to another contemporaneous current. Hysterical anæsthesia was then explicable as the result of such a dissociation, the sensations from the anæsthetic area not being non-existent, but diverted into a current separated from the main stream of consciousness. Although thus cut off and, therefore, incapable of being perceived by the main stream, they could influence the motor apparatus, and thereby produce just those phenomena which had been observed, the avoidance of injury by the hemianæsthetic and the fits in the blind boy. The conception of dissociation, therefore, served to explain the observed phenomena, and it could, moreover, be experimentally verified. The patient could be hypnotised, for example, and access being thereby obtained to the dissociated portion, the actual existence of the sensations belonging to the anæsthetic area could be conclusively established.

Functional paralyses could be similarly explained, and the conception of dissociation was found to be applicable to a wide range of

hysterical phenomena, including amnesias, somnambulisms, and double personality. Janet's work was confirmed and amplified by a number of subsequent investigators, in particular by the extensive and important researches of Dr. Morton Prince, and the value of dissociation as an explanatory concept has now been established beyond question. Certain difficulties appear in applying it to some of the phenomena with which we have to deal, but these are due rather to misapprehension of the nature of the concept than to defects in the concept itself. For example, in many cases of hypnotic somnambulism the hypnotic consciousness is aware of the whole range of the patient's experience, whereas the personal consciousness has no knowledge of the experience belonging to the hypnotic consciousness. This one-sided and non-reciprocal lack of awareness may seem difficult to explain by dissociation, which would appear necessarily to involve a break between the two streams of consciousness equally untraversable in whichever direction it might be attempted, whereas in the example we have cited the break is impassable when viewed from the side of the personal consciousness, and traversable with ease when viewed from the side of the hypnotic consciousness. The difficulty is, however, dependent upon a misconception of the nature of dissociation and an abuse of the spatial metaphor in which it has been defined. Dissociation, of course, does not imply an actual separation in space, and from the nature of the phenomena with which it is concerned it obviously can have no real spatial significance whatever. The dissociation is a functional dissociation, an 'out-of-gear' relationship, and if this is understood, the existence of a non-reciprocal dissociation ceases to be inexplicable. The spatial metaphor, in which psychological concepts are often expressed, is valid and useful so long as its real nature is carefully kept in mind, but it leads easily to abuse and untrustworthy deductions.*

Dissociation may be regarded as the first fruit of psychopathology. It was a conception built up by a strictly scientific method, it illuminated a vast field of phenomena which had hitherto baffled every attempt at explanation, and it opened up the way to therapeutic possibilities in which that control of phenomenal experience which is the ultimate goal of science was abundantly satisfied. Dissociation, however, only takes us a certain distance in the understanding of the phenomena with which we are dealing, and a further step is clearly required to answer the question "Why does dissociation take place?" This further step was attempted by Freud, but before considering the immensely important concepts which he has introduced, it will be desirable briefly to trace out a path of development in psychopathology parallel to that traversed by Janet.

* This danger, for example, has particularly to be kept in mind in estimating the value of the Freudian psychology, with its extensive use of a complicated spatial terminology in the conceptions of the conscious, pre-conscious and unconscious.

Psychopathology had approached the problem of hysteria with the aid of another conception, that of 'suggestion.' This conception had had a long historical development, including in its course the observation of certain phenomena by Mesmer, ascribed by him to 'animal magnetism,' the observation and induction of similar phenomena by the hypnotists, and the ascription of these phenomena by Bernheim to 'suggestion.' Suggestion has since been investigated from many aspects, down to the work of Coué at the present time, and it has been invoked by Babinski as the essential and finally sufficient explanation of the phenomena of hysteria. The conception involved may be crudely described as the principle that the introduction of an idea, or more properly a conviction, into the mind of an individual will tend to produce certain definite results in that individual. These results may be pathological, as in the production of hysterical symptoms, indifferent, as in the countless examples of suggestion which we see in everyday life, or remedial, as in the practice of suggestion as a therapeutic measure. The conception is clearly a psychological conception, and it has proved its value beyond all question as a weapon in the hands of the practising physician. It is, moreover, a valid conception when examined by the test of its conformity to the rules of scientific method. But it is a conception so vague, and so general in its application to mental processes, that it does not help us far in an understanding of the particular problems presented by disease. Babinski's use of it as a sufficient explanation of hysteria is clearly inadequate, and does not constitute more than a first step in the understanding of that disorder. We want to know why suggestion is so potent in this individual patient, and why certain suggestions are immediately effective in him, while others fail entirely.

We find, indeed, that in this case, as in the conception of dissociation, we have been helped to travel a certain distance, but that the need of a further advance is imperatively felt. The stage in the development of psychopathology to which these conceptions belong is comparable to that existing in the history of astronomy at the time of Kepler. Kepler had shown that the planets move in ellipses round the sun, but he could not explain why they did so. This latter achievement was the work of Newton, with his formulation of the law of gravity. Newton's step was based on the conception that the phenomena observed were the result of certain hypothetical forces, interacting in accordance with certain precisely definable laws. It thus added a *dynamic* conception as a means of understanding the observed sequence of phenomena. The corresponding step in the construction of a psychological conception capable of taking us beyond the level reached by dissociation and suggestion clearly required a similar advance to a dynamic point of view, and this was, as a matter of fact, the advance

which was actually attempted at the stage of the history of psychopathology which we are now describing.

This advance was made by Freud, and it constitutes a landmark of the first importance in the development of psychopathology. It marks the essential point of transition from the arid days of the academic psychology, with its meticulous introspective description of mental processes, to the vigorous conceptual and dynamic method of attack which characterises all growing science. Space does not permit of a detailed description of the growth of this dynamic conception, and the general lines of Freud's teaching are now so well known that it is unnecessary to recapitulate them here. It will be profitable, however, to emphasize those broad features which mark the place of Freud's work in the line of historical development which we are considering, and from this point of view the essential principles underlying Freud's conceptions may be sketched as follows. The series of phenomena which constitute conscious life and behaviour are the result of the interaction of a number of psychological 'forces,' acting according to precise psychological 'laws.'* Two or more forces may work harmoniously together, or they may conflict with one another. In the latter case an attempt at adjustment occurs, and certain of these attempted adjustments are of such a kind that morbid phenomena are produced, these morbid phenomena constituting the symptoms observed in certain forms of disorder.

Freud has built upon these basic principles a very elaborate structure, and in it are incorporated many further concepts, amongst which two may be selected for special mention. These are the conception of the unconscious, and the sex theories. Both have been subjected to vigorous attack, partly on grounds which are inadequate and misleading, and it is necessary to deal with these inadequate criticisms before passing on to the problem which is our immediate concern here, the conformity of Freud's teachings to the canons of scientific method.

The conception of the unconscious, formulated by Freud in order to explain the facts of consciousness and behaviour, has been attacked on the ground that it is philosophically untenable and intrinsically absurd. It has been held that mental phenomena must be either conscious or non-existent, and that the notion of unconscious mental processes, therefore, involves an inherent contradiction. This objection rests upon a confusion between phenomena and concepts, and a misapprehension of the function of a scientific concept. The conception of the unconscious has been formulated to explain the observed phenomena, and its validity is no more dependent on its existence as a phenomenal fact than the validity of a weightless, frictionless æther as

* A parallel, and in many essential respects identical, dynamic principle has been reached by other psychologists, in particular by McDougall in his *Introduction to Social Psychology*.

a weapon of scientific explanation is dependent upon its phenomenal existence. In both cases the validity of the concept is measured by its utility in resuming, explaining, and enabling us to control the observed phenomena.

Freud's sex theories have been attacked, sometimes explicitly, but more often implicitly, on ethical grounds. Objections of this kind have, of course, no place or relevancy in positive science, and only need to be mentioned in order that they may be at once dismissed.

Freud claims that his doctrines have been built up entirely on an empirical basis, by the observation of the facts of consciousness and behaviour, and the legitimate formulation of concepts to explain those observed facts. There seems good reason to accept, moreover, the frequently made statement that most observers who have investigated these facts by Freud's method have arrived at similar results and have confirmed Freud's teaching. It would seem, also, that Freud's concepts are constructed in a form which is unimpeachable according to the canons of the method of science, and that, if they are based upon observed facts, they satisfy all the requirements of those canons. It is, however, precisely the relation of psychoanalytic doctrine to the observed facts which requires careful investigation and consideration, and there is some reason to question whether the claim that the doctrines are directly based on facts of observation is legitimate. It is true that the doctrines are based on 'facts,' but these facts are not directly observed; they are reached by the employment of a peculiar method, the method of psychoanalysis. This method intervenes, as it were, between the actual facts of observation and the prepared facts upon which the concepts are based, and it is of such a character that the possibility of distortion cannot with certainty be excluded. The preconceptions of the analyst and of the patient, the deductions made by either or both from the material which rises into consciousness, the stage at which a series of associations is taken to have reached a significant point, all these may be influenced by disturbing factors, and, unfortunately, the influences at work are, at any rate so far as our present knowledge goes, of an incalculable character. It is at least clear that the 'facts' of observation, upon which the Freudian conceptions are based, are of a very different type to those to which we are accustomed in other branches of science. An essential rule of scientific method is that in the construction of concepts and theories a frequent appeal to experience or experiment must be possible, and when made, should yield results consonant with the concept or theory in question. In other words, our course in the regions of conceptual thinking, where it is possible to wander unconstrainedly in almost every direction, must be constantly guided and checked by stepping frequently on to the solid ground of phenomenal experience. We have seen that, in the

evaluation of Freudian psychology, this appeal is not available in the sense in which it is available in other branches of science. There is an appeal to experience, but this experience is a specially 'prepared' experience.

It is necessary to point out, however, that the defect which has been described is not peculiar to the Freudian methods, but is to some extent inherent in all psychological research. It constitutes, indeed, as Drever has shown, the essential weakness of all psychological method. In psychology the only objective facts are behaviour facts, and in order to deal with them by the psychological method, we require to go behind these facts to the subjective experience underlying them, and thereby to find a new series of facts on which the concepts are ultimately to be constructed. For this reason psychology seems doomed always to occupy an invidious position in the scientific hierarchy, and, hence, explanation of a particular series of phenomena by the concepts of another branch of science is always likely to be accepted in preference to a psychological explanation if both are available.* Nevertheless, the defect under consideration is more glaringly apparent in the Freudian theories than in other instances of psychological method, in that the process of 'going behind' the facts to establish a second series of facts is more extensive and complicated, and takes one further and further from an appeal to phenomenal experience as we are led into the depths of the 'unconscious.' In such relatively simple conceptions as Janet's 'dissociation,' on the other hand, the amount of inferential deduction beyond objectively ascertainable facts is very slight, an appeal to phenomenal experience can be made at almost every step, and the objections on the score of scientific method are, therefore, correspondingly small.

Confirmation of the criticism just put forward is furnished by comparing the widely divergent conceptions reached by different investigators in the analytic field, those, for example, put forward by Freud, Jung and Rivers. In all these different schools of thought the weapons of research are forged of much the same metal, and in not very dissimilar patterns, and yet the results obtained by their use are extraordinarily divergent. Moreover, in face of this divergence, we can make no confident decision between the conflicting claims, because the test of appeal to phenomenal experience, the test by which a similar situation in other branches of science is generally speedily resolved, cannot be adequately and satisfactorily applied.

An attempt may now be made to summarize the position reached by our review of the development of psychopathology. Psychology has clearly established its right to deal with the phenomena of human

* J. Drever, *Instinct in Man*, Cambridge University Press, 2nd edition, 1921, Chap. I.

behaviour, and to formulate psychological concepts which will serve to explain those phenomena, provided that they are constructed according to the rule of scientific method. It has to be recognized that psychology is at a disadvantage in that its method is of a character which presents inherent difficulties to the complete satisfaction of those rules, and this disadvantage is equally apparent in the section of psychology constituted by psychopathology. Nevertheless, many of the simpler conceptions of psychopathology, such as dissociation, fail to satisfy the canons of science by so small a margin that it can safely be neglected. In other conceptions, however, particularly those of the analytic schools, the margin is so large that the doctrines of these schools cannot be said to have yet attained the standard which science demands. Yet the islands of rock which dot the sea of analytic speculation are so fertile, and so suggestive of further solid ground extending far around them, that we cannot but feel that ultimately much of that sea will one day be turned into cultivated ground, and that the weapons of analytic research will be shown to be worthy of admission into the accredited armoury of science. The opinion may be ventured that the real need of the moment is the careful examination, testing and perfecting of those weapons, rather than the fashioning of further structures by their aid.

Short Notes and Clinical Cases.

A CASE OF MYASTHENIA GRAVIS.

By E. F. SKINNER, SHEFFIELD.

THE comparative rarity and etiological obscurity of myasthenia gravis must be my excuse for reporting the following case, which presented certain unusual features, though circumstances prevented a complete examination being made.

The general aspects of the disease as originally described by Sir Samuel Wilks in 1877¹ are too well known to require detailed reference here, and a very complete summary of cases (up to 1908) will be found in the Guy's Hospital Reports for that year by Morton Palmer,² but reference may be made to certain clinical and pathological features which from time to time have been added to Wilks' original description. The most important of these is that of Buzzard,³ who first described the peculiar collections of lymphocytes which are found in the skeletal muscles, as well as in the internal organs, liver, lungs, spleen and kidneys, and to which he gave the name 'lymphorrhages.' Oppenheim next reported an enlargement of the thymus gland in this disease, and since his communication a large number of other observers have corroborated this. Mandelbaum and Celler⁴ consider that new growth of the thymus is a probable pathogenic factor at any rate in a large number of cases, and Symonds⁵ has recently reported a case with an "enormously enlarged thymus which lay upon the pericardium and looked much the same size and shape as the heart." On section this was found to be largely a solid growth with enclosed cysts, and histologically "to consist of densely packed lymphoid tissue."

This enlargement of the thymus, however, only occurs in some 25 per cent. of cases, and therefore cannot be of fundamental etiological significance, though any theory as to the nature of the disease must explain this pathological fact.

Certain changes in tissue metabolism have still more recently been described in connection with myasthenia gravis, notably the diminution in creatinin excretion which is found to occur. Spriggs⁶ and Pemberton⁷ both give analyses of the urine with low creatinin values, and the latter also states that the calcium output is likewise diminished. Bookman

and Epstein ⁸ investigated a case from the metabolic point of view, and found that except for creatinin "there was no striking variation from the normal in any of the constituents studied during the experiments."

The association of myasthenia gravis with Graves' disease has been noted by several observers, and Stern ⁹ cites a number of cases collected from the literature, together with one of his own, in which there were also bronzing of the skin and tetanoid convulsions of the fingers. Chvostek ¹⁰ has suggested that myasthenia gravis may be due to altered parathyroid function, but there seems little evidence to support this, and the occurrence of bronzing, suggesting a possible adrenal lesion, offers a more likely field for investigation, since the loss of adrenal secretion is certainly intimately connected with asthenia.

However, the underlying cause of this condition is still undetermined, though there seems to be a moderate consensus of opinion that in all probability it is due to some kind of chronic infection or intoxication, and it may be that such toxin at times throws out of gear one or other of the endocrine glands, thus producing a varying clinical picture.

Case.—Seen in Ophthalmic wards, Sheffield Royal Hospital, February 26, 1923, with the following notes :—

A. H., aged sixty, married. Left eye operated on in London before the war (condition unspecified). Summer, 1922, noticed that strong light hurt the right eye. November, 1922, right eye became inflamed, and has been 'operated on' three times since then. Admitted January 12, 1923, complaining of severe pain in right side of head and face and right eye. There is deep conjunctival and ciliary injection of right eye, but cornea is clear.

Local and general treatment failed to improve the condition, and an examination of the nasal and accessory sinuses was carried out with a view to ascertaining whether any septic focus lay therein, but nothing abnormal was detected.

February 13. Local inflammation has subsided; there is no injection, but patient complains of pain in the right side of the neck where there is now a large glandular swelling.

There is no pyrexia, and no evidence of inflammation in mouth or throat.

February 26. 'Not improving.'

February 28. She was admitted to the general medical wards, and the following is an abstract of her case sheets :—

Thin elderly patient, lies in bed with her eyes shut and her head wrapped in a large woollen muffler on account of 'neuralgia'; she keeps up an intermittent querulous complaint in a low whining monotone which is difficult to understand owing to her defective articulation; the lips hardly move at all.

She complains of severe pains in the head on the right side, and also of pain in the right eye and over the right side of the face.

She lies flat in bed with the limbs extended, and her musculature is wasted and flabby. She cannot turn in bed or move a limb except slowly and with great difficulty. There is no paralysis and no tremor.

Both eyes are closed though she can open them to command, but the lids almost immediately again begin to drop.

Her mental state appears to be a kind of semi-somnolence; she will answer questions in a sleepy, monotonous voice, but has apparent difficulty in recalling events. There is no delayed cerebration, e.g., if asked to put out the tongue the act will be begun in normal time, but its completion is extremely delayed. There is a slight facial asymmetry, the right side appearing 'drawn,' suggesting slight spasm of this side or paresis of the other. Besides this asymmetry there is a complete absence of expression, and no emotional change can be evoked; the pain of a sudden pin-prick merely accentuates the querulous moaning without the participation of any facial muscle.

Eyes.—The eyes present the result of previous inflammation, old and recent. There is an areus senilis present in each eye but not complete. The pupils are inactive to light and unequal, the right being smaller than the left. Accommodation cannot be compassed. Conjunctivitis is present in the right eye.

Neck.—Multiple scars of old operations for removal of glands. Cervical glands on both sides are swollen and tender.

Limbs.—The upper limbs are thin and wasted, but the skin appears healthy. Motor power is fair, but the actions are carried out slowly. Sensation is quite normal.

Tendon jerks are all elicited in what appears normal time, and, if anything, they seem rather increased.

The lower limbs present a similar wasted appearance, but the motor power is not so good as in the upper, slight resistance sufficing to prevent any voluntary movement, though sensation is unimpaired and the tendon reflexes are all present, and, as in the upper limbs, seem to be rather brisker than normal.

The plantar reflex is flexor in type. (On the inner side of the right knee there is a hard swelling which is apparently due to enlargement of the internal condyle.)

Abdomen.—The movements of the anterior abdominal wall during respiration are normal, motor power is fair, and sensation unaffected. Abdominal superficial reflexes cannot be elicited. There is no palpable abnormality.

Chest.—The chest is pigeon-breasted, and there are several pigmented warts present. There is very marked wasting of muscles of the left shoulder (deltoid, supra- and infra-spinatus).

On percussion there is a very definite area of dulness over the front of the chest from the level of the third rib above to the lower border of the fifth rib below, on the right side, and extending about 3 in. to the right of the mid-sternal line. Behind, the percussion note is impaired over the right scapular spine. Breath sounds are feebly heard over the whole chest but are harsher on the right side than on the left, and over the area of impaired resonance there is heard bronchial breathing and marked increase of vocal resonance.

Heart.—The cardiac impulse is palpable 2 in. from the mid-line in the fourth left intercostal space: a faint systolic murmur is audible at the level of the second right costal cartilage, but otherwise the heart appears normal.

There are multiple scars of operation incisions in both breasts and both axillæ.

The clinical examination was carried out with great difficulty, owing to the extreme lassitude of the patient, and three or four days were consumed in eliciting the facts embodied in the above notes. The diagnosis was at first by no means clear, and in view of her long illness and general demeanour it was thought she might be suffering from hysteria, but by the time the examination was completed it was realized that such was not the case, and that she was in all probability the subject of myasthenia gravis, now rapidly progressing.

In an interview with her husband, the following additional facts in her past history were obtained.

She married in 1887, and had two children, a boy and a girl, both of whom are now living and quite well. Soon after marriage, the interval, however, being uncertain, she developed a 'black wart' under the left arm, which for a short time 'discharged matter.' From this time until 1911 she remained quite healthy and led a very active life. She was always an unusually unselfish and sensible woman, with a large circle of friends and extremely happy in her family life.

In 1911 there developed at the 'navel' a small growth which 'discharged' and was cured.

In 1912 she began to have attacks of nocturnal choking and in consequence was medically examined, but nothing was found.

In 1913 a 'growth' appeared in the left shoulder and an operation was performed, and two 'lumps' were removed which were 'non-malignant.' She still suffered from occasional choking at night.

In 1914 more 'lumps' were removed from the left axilla, and during this year she began to have ulcers in the right eye, which were treated for some time, and finally an irideetomy was done on this eye.

From 1914 to 1922 she had various glands removed from her breasts, chest-wall, and axillæ. In the summer of 1922 she began to get very tired after the least exertion, which fatigue gradually increased until her

admission to hospital in January, 1923, at which time she could walk only with assistance.

There was a history of some slight injury to the right knee, but particulars could not be ascertained.

The photograph (*Fig. 1*) shows, howbeit poorly, the general facies, and so long as I had her under observation I never saw her eyes open



FIG. 1.—Facies.

spontaneously, nor did she ever make any voluntary movement of any kind, being hand-fed with extreme difficulty, owing to asthenia of her tongue, masseters, buccinators and muscles of deglutition, though there was never any regurgitation of food.

An electrical examination was carried out, and the following is a copy of the report from the electro-therapeutic department:—

“**Faradism.**—Muscle groups react strongly at first, but on continued stimulation the response appears to diminish gradually until it

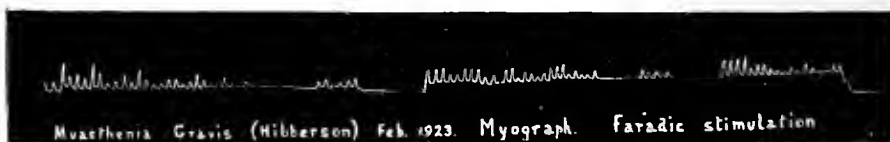


FIG. 2.

is practically *nil*. After two or three minutes' rest, restimulation evokes a brisk response, which, however, rapidly diminishes as the current is repeatedly sent in. Strength of current used, sufficient to produce a brisk contraction in normal arm.

“**Galvanism.**—Muscles twitch sharply and the twitch remains constant on repeated stimulation. K.C.C. greater than A.C.C. Strength of current, 10 m.a.”

The accompanying tracing (*Fig. 2*) is a myogram of the contraction of the finger flexors on stimulating with a faradic current sent in at

intervals of a second, the current being switched off when the waves were seen to be minimal and restarted in about twenty seconds.

The tracing shows a gradual diminution in the response, up to complete absence, followed by a quick return after the muscle has rested (the excursion of the point is small, as the muscle was contracting against a spring resistance to produce fatigue quickly).

A complete basal metabolic examination could not be undertaken, but Dr. C. G. Imrie kindly carried out a urinalysis with the following results:—

Total quantity in 24 hours	. . . . .	305 c.c.
Creatinin	. . . . .	0.602 gm.
Creatinin after hydrolysis	. . . . .	0.658 ..
Creatin	. . . . .	0.056 ..

After hydrolysis the urine was very dark in colour, making accurate reading extremely difficult, and it is not certain that all the urine was obtained, so that the result of this examination is not of great weight, particularly as it could only be done on one occasion. Such as it is, the figures show a slight diminution in the excretion of creatinin.

A blood count gave the following figures:—

Red cells	. . . . .	4,353,000 per c.mm.
Hæmoglobin	. . . . .	58 per cent.
Colour index	. . . . .	0.67
White cells	. . . . .	6,133 per c.mm.

Beyond a slight anæmia of secondary type and a rather more pronounced leukopenia the blood count presents nothing abnormal. A differential count of leucocytes was not recorded, but there were no abnormal cells of any kind.

A skiagram of the chest was taken (*Fig. 3*). It will be noticed that there is a well-marked band of shadow on the right side, in the same situation as the area of impaired resonance elicited in the clinical examination of the chest. The radiologist's report is as follows:—

“On account of the mental and physical condition of the patient, it was not possible to make a complete examination, particularly as regards the posterior mediastinal space. The film shows a broad band-like opacity on the right side, springing from the right hilar region and running transversely across the lung. This is possibly due to peribronchial infiltration. There is also some flocculent opacity on the left side extending from the hilar region to the left apex.”

The Wassermann reaction was negative in the blood.

The above examinations were made between February 28 and March 7, on which day the patient's husband asked permission to take her home, as it was clear that her death was a matter of a short time only. After her return home no further observations were possible, but she lived for ten days in a state of gradually increasing asthenia.

No autopsy was obtainable, but permission was given to excise a small piece of muscle from the calf, and this was done with great difficulty through a small linear incision. It is regretted that no other pathological findings are available, as the tissues underlying the scars might have been of much interest, and the nature of the cervical swellings, as well as the cause of the 'thoracic shadow' and impaired chest resonance, might have been disclosed. It was hoped that permission might have been obtained to take the muscle for examination from the group of atrophied shoulder muscles, but unfortunately the calf muscle was specified. This is the more regrettable, as the small fragment obtained from an area free from any gross clinical changes is of considerable interest and shows marked departure from the normal (*Figs. 4 and 5*). The striation of the muscle fibres seems to be irregular, some fibres being well, others rather poorly, striated, and there is a very marked increase in the number of the sarcolemma nuclei. These nuclei are seen between the muscle fibres in much greater profusion than normal, and in several places they are so numerous as to be contiguous, giving the appearance of a thread of jointed mycelium. Besides the increase in nuclei, there are also some deep-staining granular masses between the muscle fibres.

DISCUSSION.

The case presents several features of clinical and pathological interest. In the first place, the illness began by the appearance of glandular enlargements of indeterminate type, and that this was an integral feature of the condition is supported by their almost continuous appearances up to the date of death. It seems reasonable to assume that the percussion dulness and the *x*-ray shadow in the chest were in all probability due to glandular swellings in the mediastinal space and along the interlobar plane of the right lung.

Again, the condition of the eyes is of great interest, since it was of such chronicity that it was present from 1914 to 1923, and though not cataractous, yet was of such a nature as to necessitate an iridectomy on account of 'opacity.' It is to be further noted that during the last stages of the illness, together with an exacerbation of the conjunctival inflammation, there appeared simultaneously a swelling of cervical glands, a combination of symptoms which had occurred more than once before, suggesting that both were due to a common cause and seemingly pointing in the direction of a possible infection.

The most interesting pathological feature is the histological appearance of the muscle fibres. Though none of the typical lymphorrhages were found in the small fragment examined, there was noted a very marked increase in the nuclei of the sarcolemma. These were arranged in chains and were sometimes contiguous, closely resembling the picture recently described by Adie and Greenfield¹¹ in cases of myotonia



FIG. 3. - Skiagraph of Chest.



FIG. 4.

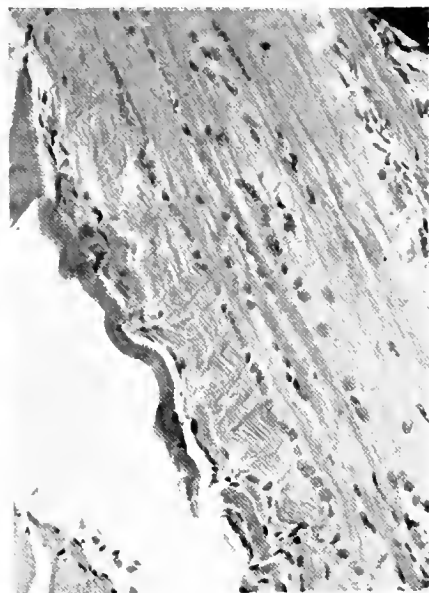


FIG. 5.

atrophica, though there were none of the intrafibrillar rods which these authors look upon as the essential histological feature in this disease. It will be recalled that both in myotonia atrophica and myasthenia gravis cataract forms a common extra-muscular accompaniment.

Though it cannot be claimed that the case recorded here warrants any definite conclusion, nevertheless it lends some support to the view of a toxi-infective process as the possible cause of the disease: the recurring glandular swellings which at times underwent rapid changes, as in the case of the cervical glands during the last month of life, strongly suggest a reaction to some infection, and the fact that this occurred with a flaring up of a frank conjunctival infection is some corroboration of such a hypothesis. The previous history of the illness further points to the probability that such glandular swellings had been periodic, which at once suggests a dim possibility of relationship to Hodgkin's disease.

I should like to record my thanks to Professor A. J. Hall, to whose kindness I am indebted for permission to observe and record the case.

SUMMARY.

1. The first sign of any ill-health was in 1911, with the appearance of pigmented warts.

2. In the following year (1912) occurred periodic attacks of nocturnal choking, which, in view of later events, suggest the probability of swelling of thymus or other glandular tissues.

3. In 1914 multiple lymphoid growths appeared from time to time, together with chronic inflammation of the eyes.

4. The last six months of life were characterised by rapidly progressing muscle fatigue with some atrophy.

5. The clinical diagnosis of myasthenia gravis seems fairly established.

6. The histology suggests some resemblance to that of the muscles in myotonia atrophica.*

7. The eye symptoms may also be considered as indicating a possible connection with the latter condition.

8. The periodic glandular swellings also recall the similar condition in some cases of lymphadenoma.

* Buzzard, in his article on myasthenia gravis in Clifford Allbutt's *System of Medicine* (vii, 57), suggests its possible relationship with Thomsen's disease.

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Editorial.

CORTICAL FUNCTION IN RELATION TO THE NEUROSES.

WHATEVER the explanation of the genesis of the neuroses, there can be no question that many of the symptoms are the direct result of fatigue. Such fatigue may be produced by physical overwork, though this is rare, or by mental overwork on the conscious or at the unconscious level. Fatigue, however, is not an explanation of the neurasthenic state in itself. This is why the old-fashioned 'rest cure' in cases of neurasthenia was frequently inadequate. So long as the fatigue was due to friction between the ego as a whole and the outside world, then the removal of the friction by isolation of the ego allowed for the necessary recuperation, and recovery resulted. When, on the other hand, the fatigue was the result of friction within the ego, then mere rest was not enough, for the friction still persisted and cure did not ensue. It is a truism in neurology that the higher structures are more readily fatigued than those of lower levels: naturally, the highest level structures suffer first and most severely from any process of fatigue. The study of racial and individual development shows clearly that the highest grade structure in man is the cerebral cortex, and the functions of this aggregation of cells are upset by the processes of fatigue earlier and more markedly than the other functions of the body.

The conceptions of these functions have changed not a little in recent years. With the tremendous impetus given to anatomical and histological study by the improvements in optical and electrical methods which took place in the last half of the nineteenth century, it seemed possible that the researches of such workers as Ferrier and Wernicke would lead to a mapping out of the whole cortex into geographical areas, each of which would be found to correspond to a definite function connected with definite parts of the body. More recent work, however, has turned attention in other directions. Sherrington has shown that stimulation of certain spots even in such well-defined regions as the cortical motor area does not always produce the same result. He found that responses in the muscular system depend on such factors as the order of stimulation in the motor field: for example, excitation from above downwards in a certain area results in elbow flexion, while from

below upwards stimulation of the same points results in adduction of the thumb and extension of the index. Exact anatomical correspondence can no longer be regarded as part of the business of the cortex, though it is, of course, quite clear that certain cortical areas have to do with certain major functions of the body, such as motion, sensation, and the work of the distance-receptors involving vision and hearing, and so on. In these relations the functions to which cortical structure is essential are control, integration, discrimination and reference in time and space. In the motor area the first three are specially well illustrated. The work of Hughlings Jackson and his successors has shown how the uncontrolled action of lower motor centres is the real explanation of fits, while it is only when the motor cortex is intact that integrated and co-ordinated movements as opposed to muscular actions are possible. Again, without the intervention of this cortical function the discriminated movements of skilful manipulation are impossible. The work of Head and his coadjutors on sensation leads to similar conclusions. The sensory cortex subserves five functions: (1) the recognition of posture and passive movement; (2) the recognition of certain tactile elements; (3) the appreciation of two points applied simultaneously to two different spots on the surface of the skin, and also the recognition of the size and shape of objects in contact with the skin (spatial discrimination); (4) the localization of the situation of a stimulated spot on the skin, and the recognition of two consecutive stimuli (discrimination of time); (5) the recognition and discrimination of a scale of sensations with heat at one end and cold at the other. In addition it is the function of the cortex to relate one sensation with another.

Bianchi's work on the frontal lobes suggests similar main principles of function. He finds that monkeys whose frontal lobes are mutilated show defects of perception, and of discrimination between objects with superficial resemblance: they cannot distinguish between threat and reality, and so become to a large extent incapable of play. They also display deficient observation, objects which would be investigated by the normal monkey being overlooked. Memory is defective, so that past experiences are not utilized, nor do they learn by present experience. Associative power is greatly reduced, and there are no new adaptations. Judgment is poor and immediate. There is a lack of initiative, and one movement does not lead to another: thus a monkey will seize a door handle (stimulus to bright object), but will not proceed to turn it. The primitive emotions remain—the desire for satisfaction of hunger, thirst and other organic needs, and especially that irrational, illogical fear which seems to have no definite relation to stimuli: but higher sentiments, such as friendship, gratitude, jealousy, maternal protection, dominion, authority, self-esteem, ridicule, and, above all, that of

sociality, disappear. Conduct is incoherent, while stereotyped actions and ties are often present.

It is remarkable that the behaviour of neurotics is mainly characterized by deficiency in what we have learnt to regard as the chief functions of the cortex. To take a few examples: in hysterical paralyses it is movements that are impeded, not individual muscular actions. It is characteristic of hysterical pain that the reaction in some ways resembles that seen in the thalamic syndrome, in which cortical control is absent. The behaviour of neurotics always tends to be of the 'all-or-none' variety. This is specially true of their emotional reactions, which closely resemble those of Bianchi's monkeys. Their undiscriminated anxieties and fears are primitive affective reactions in no way co-ordinated into properly organized emotions and sentiments, and the resolution of these by the process of abreaction essentially involves their proper discrimination and correlation. In the case of the obsessions the salient feature is the want of accurate reference in time and space. So much is this so that it is only by restoring the proper time-space-relationship of these symptoms that they can be removed.

This brief review may serve to indicate that the immediate precursor of neurotic symptoms is the abrogation of cortical function, and that this failure of function is probably due to the action of fatigue products. This conception does not run counter to other explanations of neurotic symptoms, such as dissociation, for the most marked forms of dissociation of function are those produced when the associative function of the cortex is in abeyance. Indeed, it is clear that a properly associated personality is only possible when the cortex is intact. It is, of course, the duty of the physician not to be content with this explanation of symptoms, but to strive to discover the true cause of the fatigue; by this means only will he cure the disease, and not merely remove the symptoms. None the less, the recognition that fatigue of the cortex is an important factor in this connection is salutary, since it will tend to broaden the outlook of the therapist and prevent his applying only one method of treatment to all cases of neuroses. He will remember that fatigue may be induced by mental conflict, by prolonged toxæmia, by endocrine disturbances, and by overwork, and so he is less likely to miss his view of the wood by too great concentration on individual trees.

Abstracts.

Neurology.

NEUROPHYSIOLOGY.

- [173] The physiology of the cerebellum (Contribution à l'étude de la physiologie du cervelet : la fonction inhibitrice du paléo-cerebellum).—BREMER. *Arch. internat. de physiol.*, 1922, xix, 189.

AMONG the conclusions of this interesting paper are the following :—

(1) The cerebellum (cortex and nuclei) and the red nuclei do not furnish any quota to the rigidity of decerebration.

(2) In the decerebrate animal electrical excitation of the anterior lobe of the palæocerebellum invariably inhibits decerebrate rigidity. The excitable zones of the palæocerebellum correspond exactly to the terminal areas of the spinocerebellar tracts.

(3) The latter are divisible into right and left hemi-zones, each inhibiting the extension-contraction of the homolateral limbs.

(4) Stimulation of the cerebellar cortex has only a minimal effect on the limb flexors—contrary to what is obtainable from excitation of the nucleus dentatus and the superior cerebellar peduncle.

(5) The efferent inhibitory path appears to be a cerebellorubral (? fastigi-rubral) path.

(6) In the normal animal destruction of the inhibitory zones of the cerebellum always produces extensor rigidity of the limbs, and in the case of decerebration it enhances the existing rigidity.

(7) The cerebellum can only furnish its support to the maintenance of muscle tone by its association with the thalamus and the cerebral cortex.

The cerebellar mechanism of extensor inhibition corresponds to the spinocerebellar anatomical system and is autoregulative in function.

S. A. K. W.

NEUROPATHOLOGY.

- [174] A note on the comparative histopathology of acute anterior poliomyelitis and epidemic encephalitis.—G. B. HASSIN. *Arch. of Neurol. and Psychiat.*, 1924, xi, 28.

ALTHOUGH distinct morbid entities, acute anterior poliomyelitis and epidemic encephalitis may present a very close similarity in the localization and character of the lesions in the central nervous system. This is well brought out in two examples studied by Hassin, where the histological appearances in the cerebrum, pons and medulla were indistinguishable. Differentiation

was only possible by a comparison of the spinal cord lesions. In the poliomyelitic cord more ganglion cells were destroyed, and the parenchymatous changes were altogether much more marked than in the other case.

R. M. S.

- [175] Studies on the cerebrospinal fluid with an acetic anhydride-sulphuric test.—OSWALD H. BOLTZ. *Amer. Jour. Psychiat.*, 1923, iii, 111.

The writer concludes that :—

1. The A.A.S. test is invariably positive with spinal fluids from cases of general paresis.
2. Among psychiatric cases the A.A.S. test is found positive predominantly in cases with neurosyphilis.
3. The more advanced and active we find the syphilitic condition of the central nervous system, the more positive will be the A.A.S. reaction. In syphilitic clinics the test may prove to be valuable in the prognosis of neurosyphilis.
4. In psychoses not due to or complicated with syphilis, and of a functional nature, the A.A.S. test is negative.

C. S. R.

- [176] Application of the Warthin-Starry silver-agar method to the demonstration of *spirochæta pallida* in the spinal fluid by means of coagula obtained by the Alzheimer method.—WARTHIN, WASTROM and BUFFINGTON. *Arch. of Derm. and Syph.*, 1923, viii, 461.

The silver-agar stain was applied to 115 spinal fluid coagula taken from syphilitic subjects, and positive findings of *spirochæta pallida* were obtained in twelve of the cases examined. Of these eight were in the primary or secondary stage, two were in the tertiary stage, one was a case of tabes with optic atrophy, and one a general paralytic.

R. M. S.

- [177] Yellow spinal fluid : its origin and significance.—F. J. SCULLY. *Arch. of Neurol. and Psychiat.*, 1923, x, 83.

XANTHOCHROMIA has been reported in over 350 cases in association with pressure on the cord, hemorrhagic inflammation, and hemorrhage into the spinal fluid. The condition is ultimately of hæmatogenous origin and may develop in two ways : transudation of blood serum, and hæmorrhage. Both are important, and one or the other may predominate in a given case. With few exceptions yellow spinal fluid is indicative of organic nervous disease, but an exact diagnosis of spinal disease cannot be made on the basis of the spinal fluid findings alone. In general, xanthochromia and massive coagulation indicate meningeal adhesions or compression of the cord by tumours ; xanthochromia without coagulation indicates meningeal inflammation or hæmorrhage into the spinal fluid.

R. M. S.

- [178] **Studies of the metabolism in epilepsy.**—LENNOX, O'CONNOR and WRIGHT. *Arch. of Neurol. and Psychiat.*, 1924, xi, 1.

IN a large group of epileptic patients examination of the blood for total non-protein nitrogen, urea nitrogen, amino-acid nitrogen, uric acid and creatin showed these constituents to be within normal limits.

R. M. S.

SENSORIMOTOR NEUROLOGY.

- [179] **Aneurism of the basilar artery** (Contribution au diagnostic des anévrismes de l'artère basilaire du cerveau).—KRABBE and BACKER. *Acta med. Scandinav.*, 1922, lvi, 95.

THE diagnosis of intracranial aneurism of syphilitic origin is often curiously difficult. The authors cite a number of cases from the literature in which the exact nature of the condition was not recognized during the patient's life. For basilar aneurisms they suggest attention should be given to the following points: (1) the development alternately of hemiplegia and paraplegia, i.e., of hemiplegia first on one side and then on the other, neither clearing up entirely, and thus in the end producing a diplegia or paraplegia; (2) symptoms indicating involvement of bulbar centres and nerves, and to a less extent of pontine centres and nerves; (3) in particular, the appearance of vomiting and of respiratory embarrassment; (4) moderate cerebellar symptoms.

These points suffice for an extrabulbar affection; its aneurismal nature will be confirmed by a positive Wassermann reaction, by marked alternation in the progress of the case, as mentioned above, by the presence of papilloedema (variable), and by the existence of a subjective feeling of pulsation in the head and of objective bruits on cranial auscultation (inconstant).

S. A. K. W.

- 180] **On herpes zoster** (À propos du zona).—LOUIS RAMOND. *Progrès méd.*, 1923, 97.

HERPES zoster is an infective malady which is characterized by the eruption of erythematous spots surmounted by vesicles. The eruption is discrete, has a unilateral localization, and produces pain of a neuralgic type, which is referred to the site of the eruption. The nature of the virus is not certain, although we know its location is the posterior root ganglia. Head and Campbell have regarded the disorder as an acute posterior poliomyelitis.

Accompanying the rash there is fever, malaise and nausea, and Ramond states he always finds enlargement and tenderness of the lymph glands which drain the affected area. This adenitis is unilateral and strictly local. It occurs without ulceration of the herpetic area, and is at its height at the time when the crop of herpes appears. It gradually diminishes, to disappear at the end of a week, and is to be distinguished from the secondary adenitis which may result from infection of the vesicles.

In those cases (*Zonas frustes*) where one of the two cardinal symptoms (pain or rash) is lacking the diagnosis is not so clear. Painless herpes occurs chiefly in small children, and the distribution of the rash suggests its real nature. In herpes without the eruption the disorder may fail to be recog-

nised, and here the presence of a local adenitis corresponding to the distribution of the neuralgic pain would be suggestive. The presence of moderate lymphocytosis in the cerebrospinal fluid would confirm the diagnosis, since this does not occur in the simple neuralgias. Small patches of herpes are due to inflammation of localized portions of the posterior root ganglia. It is possible that the anterior portion of the intercostal space presents the eruption when the outer pole of the ganglion is inflamed, and the posterior portion of the space when the inner pole is affected.

The occurrence of lymphocytosis in the cerebrospinal fluid indicates slight involvement of the meninges in the region of the particular posterior root ganglion involved. Occasionally a definite mild local meningitis results, leading to severe pain in the back, slowing of the pulse and exaggeration of the deep reflexes.

Rarely motor paralysis limited to the muscles supplied by the same segment as is affected by the herpes has occurred. It is noticeable some four or five days after the appearance of the eruption, is slowly progressive, and of the lower motor neurone type. Examples are seen in ophthalmic herpes with partial oculomotor palsy, and in auricular herpes and facial paresis (Ramsay Hunt's syndrome of the geniculate ganglion).

In conclusion the author reviews the treatment for the pain of this disorder, and expresses the view that drugs—by the mouth or injected locally—are very satisfactory, and that not even in the rare cases of severe pain is section of the posterior nerve roots to be counselled.

W. JOHNSON.

[181] **Bilateral neuroblastoma of the Gasserian ganglion** (Neuroblastoma maligno bilaterale del ganglio di Gasser).—OMODEI-ZORINI. *Giorn. R. Accad. Med. di Torino*, 1923, lxxxvi, 158.

IN view of its rarity a case of neuroblastoma of the Gasserian ganglion is always of documentary value. The patient was a young man of twenty-three, who developed unbearable temporal and frontal headache and neuralgia, first on the left side and two months later on the right, progressive diminution of vision, diplopia, paralysis of the left sixth and paresis of the right, weakness of the lower face on both sides and diminution of hearing; the pupils reacted to light badly, and there was notable limitation of masticatory and lateral jaw movements. The only area of objective loss of sensibility was over the upper left fifth, where it was absolute. Death ensued after an illness of five months' duration.

Each cavum Meckelii was occupied by a semilunar-shaped tumour, about the size of a large cherry. Microscopical examination showed the characteristic features of a neuroblastoma of a high degree of malignancy. Ganglion cells of varying size and shape were present in enormous quantities, with bundles of fine myelinated fibres mainly towards the periphery. Metastases were found in the left occipital and temporal lobes, and in the choroid plexus. The author mentions only one case of similar Gasserian tumour from the literature, but others are known.

S. A. K. W.

- [182] **Macular heredo-degeneration in four members of a family** (Heredo-degeneratio maculae centralis retinae bei vier Geschwistern).—ALKIO. *Acta Ophthalmologica*, 1923, i, 27.

SOME ninety cases, it appears, are on record of the comparatively rare condition known variously as familial or hereditary macular degeneration. Four cases added by Alkio concern three brothers and one sister, five others of the same family being unaffected. It is extremely interesting to note that a son of one of the non-affected brothers is a case of the amaurotic family idiocy of Tay-Sachs.

Alkio draws particular attention to the similarity in facial appearance and bodily 'build' of the four affected members, as well as to the resemblances in their ocular symptoms and in the ophthalmoscopic picture of their retinae. The symptoms of all are: (1) slight optic atrophy, (2) complete colour blindness, (3) nyctalopia from the outset, (4) central scotoma, (5) bilaterality of the condition. The macular change is one of a sprinkled or scattered white-pepper-like or yellowish flecking over and in the immediate vicinity of the macule, coupled with irregular ringed pigmentary degeneration round the latter, dark in colour.

The literature and the pathology are discussed concisely. The author seems to approve the classification of Stargardt: (1) familial presenile macular degeneration (Tay) (chorioiditis guttata); (2) familial honeycomb-like macular degeneration (Doyme); (3) familial congenital macular degeneration (Best); (4) familial progressive macular degeneration with or without mental change. He places his own cases in the last of these.

S. A. K. W.

- [183] **The incidence of acute epidemic encephalitis in Bellevue Hospital in the months of January, February, March, 1923.**—RAYMOND S. CRISPELL. *N.Y. Med. Jour.*, 1923, cxviii, 402.

A RECORD is given of symptoms which occurred during the acute stages in forty-two cases of epidemic encephalitis. The incidence in the majority of these was on the third and fourth decades of life. Influenza preceded the disease in five cases. The onset, which in twenty-four cases was characterised by neuralgic pains in the back of the head, neck and arms, was sudden in nine cases and gradual in twenty-six. In the majority the temperature did not rise above 101° F. Of cranial nerve palsies, about 25 per cent. of the cases showed either ptosis, nystagmus, external rectus paralysis, or unilateral facial paralysis. Sluggish pupils—whether to light or accommodation is not stated—were observed in ten cases. The Parkinsonian facies was noted in twelve. Involuntary movements included tremor of the hands, mouth and jaw, and of the whole body in a very few instances. Choreiform movements were noted twice. None showed evidence of involvement of the pyramidal tracts.

Other symptoms included giddiness, stupor, apathy and somnolence, but actual lethargy was noted on only two occasions. The spinal fluid showed a small lymphocyte count of twenty to thirty. In twelve cases the result was fatal, but the autopsy findings are not recorded.

L. R. YEALLAND.

- [184] **Ambulatory encephalitis.**—L. GRIMBERG. *Arch. of Neurol. and Psychiat.*, 1924, xi, 64.

As a rule the clinical findings in the ambulatory patient suffering from mild encephalitis are of no assistance in forecasting the probable development of the case, but occasionally indications that a mild case is on the threshold of the development of an acute condition may be encountered. Grimberg believes that implication of the fourth cranial nerve is of grave import. In his series those patients who showed a loss of upward gaze developed the severe form of the disease.

R. M. S.

- [185] **Catalepsy in epidemic encephalitis.**—A. E. BENNETT. *N.Y. Med. Jour.*, 1923, cxviii, 399.

A CASE of epidemic encephalitis showing extreme muscular hypertonia, rigidity and catalepsy, with the autopsy findings, is reported by the author.

Macroscopically, the brain and cord appeared normal. The meninges showed in places a slight infiltration of lymphocytes and a few plasma cells. Except for a few petechial hemorrhages, the cortex was normal. In the medulla the adventitial lymph-spaces of a few vessels contained round-cell elements. Evidence of disease was found in the pons, but the changes were most marked in the mid-brain and basal ganglia. In places, the thalamic structure was almost unrecognizable because of infiltrating cells around the vessels and in the tissue substance itself, with a disappearance of ganglion cells. Evidence of the disease was less marked in the corpus striatum. In the mesencephalon the substantia nigra was particularly involved, resulting in an almost complete disappearance of the normal pigmented cells and their replacement by lymphocytes and glia nuclei.

The author is of the opinion that patients of this cataleptic type who recover will show paralysis of automatic association movements, rigidity, tremors or other residual Parkinsonianlike forms. Catatonia with rigidity should not be mistaken for a schizophrenic reaction. The clinical history, with evidence of a febrile infective process, the association of 'cog-wheel' resistance, rigidity, tremors of a paralysis agitans type, myoclonic twitchings or other neurological signs, and the spinal fluid examinations, should differentiate the case from catatonic dementia precox: the absence of other schizophrenic phenomena should make the diagnosis certain.

L. R. YEALLAND.

- [186] **Summary of symptoms of encephalitis lethargica.**—F. X. DERCUM. *N.Y. Med. Jour.*, 1923, cxviii, 397.

THE writer gives a very complete summary of the symptoms of encephalitis lethargica. He regards dimness of vision as a symptom of great importance, as it is not only early and striking, but may be noted when both diplopia and ptosis are absent or only slightly present. It is due to a paresis of accommodation, and frequently also of convergence. There is paresis of the ciliary muscle and of the iris. The light reflex, in the majority of cases, is intact, so that a reversed Argyll Robertson pupil is obtained. A true Argyll Robertson pupil

may occur and may be temporary. A true aniblyopia unaccompanied by changes in the fundus is sometimes present. Very rarely, swelling of the disc, blurring of its edges with tortuosity of the retinal veins and pallor of the temporal half, a slight hyperaemia, or a slight neuritis, occurs. The development of frank double optic neuritis is attributable to gross changes within the cranium such as meningitis, marked involvement of the ears and consequently of the great venous sinuses, etc., and not to the encephalitis itself.

L. R. YEALLAND.

- [187] **Unioocular hemianopia of central origin** (L'hémianopsie unioculaire d'origine centrale).—ANTON LUTZ. *Ann. d'oculistique*, 1923, clx, 265.

A HEMIANOPIA strictly limited to one eye is comparatively uncommon; its most usual cause is some intra-ocular lesion (glaucoma, detachment of the retina, vascular disease of the retina). Rarer are the extrabulbar varieties, e.g., chiasmatic lesions producing blindness in one eye and hemianopia in the other, the latter being commonly temporal, but very occasionally nasal. Lutz devotes his paper to a consideration of the unioocular hemianopias that may be effected by lesions anywhere from the lamina cribrosa to the calcarine area, dividing them into the successive groups of the optic nerve, chiasma, optic bandelette, optic radiations, and visual cortex.

A number of cases of monocular hemianopia due to limited lesions of the optic nerve are cited from the literature, and several personal ones added; most of these have shown a field division not exactly vertical, but irregular or oblique. Some have been cases of syphilitic leptomeningitis, and others of tabes; a few have been inflammatory otherwise, or traumatic, or toxic or toxi-infective. Lesions of the chiasma cannot cause the symptom unless they are at the edge of the crossing, as it were; no cases are quoted in respect of this. As for the optic bandelette, opinion is divided as to the existence or not of separate tract fasciculi in it. That such a division in fact occurs is supported by the various cases of monocular hemianopia from bandelette lesions given by Lutz. There are occasional examples of the syndrome from lesions along the geniculo-calcarine course of the optic fibres, suggesting that the two groups (crossed and uncrossed) are separable practically throughout; some cited by Lutz are very demonstrative.

The comparative study of the cases quoted, and their clinical evolution, are discussed; and some good drawings of the course of the two groups of fibres are furnished.

S. A. K. W.

- [188] **The symptomatological value of idiomuscular contraction** (Valeur sémiologique de la contraction idiomusculaire).—ROVIRALTA. *Archivos de Neurobiol.*, 1923, iii, 1.

THE idiomuscular contraction of Schiff (muscular 'knot' of Richet) is that contraction which is obtainable in health and disease without the intervention of the nervous system. Mechanical, electrical, chemical and thermal stimuli will produce it. It is commonly exhibited by means of an ordinary

percussion hammer, and the contraction is limited to a group of muscle fibres approximately equal in size to the superficial dimension of the exciting body. The author has examined the phenomenon in a large number of cases of nervous disease, but does not formulate his general conclusions in any synthetic fashion. He notes the modifications of myotatic irritability ensuing on changes of a dyskinetic nature and on alterations in muscle tone. Speaking generally, the less the tonus, the greater the idiomuscular contraction, as in cerebellar disease, tabes, etc. [This is contrary to the views of some other investigators.] In cases of muscular rigidity it is reduced. Many details are furnished of the behaviour of the Schilling 'wave' under different conditions of nervous system and of muscle, and its pathological physiology is sketched in a somewhat speculative way.

S. A. K. W.

TREATMENT.

[189] **Treatment of epilepsy** (*Le traitement de l'épilepsie*).—V. DEMOLE. *Arch. Suisses Neurol. et Psychiat.*, 1922, xi, 215.

THE author proceeds to review the more recent therapeutic agents in the treatment of epilepsy.

Proteinotherapy.—Injections of albumin, microbial toxins, etc., subcutaneously, intramuscularly or intravenously, have in certain cases led to surprising results. Doelken has used injections of cow's milk intramuscularly—2 to 5 c.c. in adults and 1 to 2 c.c. in children—three times a week. Five or six hours after the injection there is a feeling of well-being. Doelken uses luminal, 0.1 gm. to 0.3 gm., in addition to his injections. At the end of six months the injections of milk are reduced to one each week.

The fact that in some cases the attacks seem to be periodic, occurring at a certain time during the day or night, during the menses, etc., seems to point to epilepsy being of the same nature as asthma, urticaria, migraine and angioneurotic oedema. In this view the attack is evidence of the presence of an anaphylactic shock, and in support of this there is the observation of Widal, who states that he has produced attacks by injecting the patient with his own serum.

The author states he himself has had no success with intravenous injections of milk, and also that attempts at desensitization with 20 per cent. sodium hyposulphite solution have led to no better results.

Psychotherapy.—Those cases of fits cured by this means the author would regard as being purely hysterical in character.

Endocrinology.—A type of epilepsy is recognized in England and America as being due to hypofunction of the pituitary gland. In this type the fits appear at puberty, the sella turcica is enlarged, and the patient presents the dystrophia of hypopituitarism. Such cases improve considerably when treated with injections of the gland.

Surgery.—In head injuries no more improvement is to be hoped for by operation than can be obtained by sedative drugs, with the added risk that a monoplegia or hemiplegia may be the sequela of the operation.

Sedatives.—Luminal, 0.2 to 0.5 gm. daily in the adult, lessens both the

frequency and the gravity of the attacks. In combination with atropine and bromides still better results are obtained.

Of the borates, potassium borico-tartrate is the most efficacious, and its use is not attended by any unpleasant after-effects.

In his final summary the author reverts to the value of bromides, and states that administration of bromides together with a partial salt-free diet remains the most effective treatment of epilepsy.

W. JOHNSON.

[190] Phenobarbital (luminal) treatment of insane epileptics.—IRA A. DARLING. *Arch. of Neurol. and Psychiat.*, 1923, ix, 478.

THE author records the treatment with phenobarbital of a series of insane, hospitalized, male epileptics, and the conclusions given below are based on observations made on the following groups of patients: (1) 15 idiopathic epileptics treated for 8 months; (2) 13 idiopathic epileptics treated for 21 months; (3) 12 idiopathic epileptics treated for 8 to 13 months; (4) 6 traumatic epileptics treated for 13 months; (5) 6 senile epileptics treated for 8 to 13 months; (6) 2 syphilitic epileptics treated for 14 months.

His conclusions are summarised as follows:

1. Phenobarbital has a cumulative effect that appears to be successfully combated by a break of two days in each week during its administration.

2. A sudden break in its administration is sometimes followed by a series of seizures. There is much less danger of such trouble if bromide is given as soon as the other is withdrawn.

3. One and a half grains (0.09 gram), given five days in each week, appears to be a safe dosage. If larger amounts are given, very careful observation is necessary to detect possible toxic symptoms early and to prevent the more serious disorders.

4. The use of this drug may be followed by: rash, simulating measles or scarlet fever; symptoms like those of alcoholic intoxication; severe cholera-like diarrhoea; mental hebetude; delirious states; and other like troubles.

5. Favourable results were obtained from the administration of phenobarbital in cases diagnosed as idiopathic and traumatic epilepsy. The results in cases diagnosed as senile and syphilitic epilepsy were doubtful.

6. The drug is not to be considered as a 'cure' or specific for epilepsy.

7. Phenobarbital and bromide may be combined and better results thus obtained in selected cases.

8. Each case should be considered as an individual problem and phenobarbital, bromide, or a combination of the two used according to the results.

E. B. G. R.

Psychopathology.

PSYCHOSES.

[191] True melancholia and periodic asthenia (*Mélancholie vraie et asthénie périodique*).—R. BENON. *Gaz. méd. de Nantes*, 1923.

DR. BENON combats the generally accepted ideas of Kraepelin on periodic

depressed states. True melancholia is a distinct clinical entity. Recurrent depressed states he terms 'periodic asthenia.'

The following clinical facts serve to distinguish the different mental states :

The true melancholic is usually forty to fifty years of age. The onset is gradual and accompanied by a sense of sorrow, and often regret. Agitation and anxiety may follow. Ideas of self-accusation, of ruin, of fear for the future predominate.

Periodic asthenia begins suddenly at any age, its onset being measured in hours or days. Deep depression and retardation are the chief characteristics of the mental state.

The true melancholic gradually develops a secondary general asthenial. This exhausted condition is present during the whole of the periodic asthenia. Accusatory and self-depreciatory delusions are more marked in the true melancholics. These cases often recover, and recover slowly, and rarely relapse. The periodic asthenias make brusque recoveries and relapse frequently. One recovers by lysis and the other by crisis. An unusual type of true melancholia is described in which there were four relapses.

The author gives it as his opinion that confusion and hallucinations are quite common in true melancholia, but rare in the periodic asthenia cases.

G. W. B. JAMES.

[192] Melancholia and mania (Mélancholie et manie).—R. BENON. *Revue neurol.*, 1923, xxxix, 46.

THE author considers that Kraepelin's conception and clinical descriptions of manic-depressive states should remain open to examination and discussion. He quotes a lengthy clinical description of a case in which a man of forty-one with a bad family history had an attack of acute depression, with delusions of sin and unworthiness, and finally hallucinations, though they were not marked. The condition became relieved after some months and 'asthenic' (e.g., exhaustion) signs became very marked. These exhaustion signs were slowly replaced by evidences of excitement and psychomotor restlessness, and finally a condition of mania was reached. This condition disappeared, and the patient was discharged recovered.

Benon concludes from this example that the excited phase had nothing to do with the melancholic condition which commenced the illness, but followed the secondary asthenic condition resulting from the depressed phase. Briefly, his thesis is that what Kraepelin and most English writers describe as the 'stadium debilitatis,' or exhaustion condition following the melancholia in the case described, must actually be considered the cause, and true opposite of, the mania which supervened. The 'mixed states' of Kraepelin, Benon considers a conception for which there is no foundation in clinical observation.

G. W. B. JAMES.

- [193] Constitutional psychoses ending in permanent recovery.—ROSANOFF and BERGMANN. *Arch. of Neurol. and Psychiat.*, 1924, xi, 70.

THE general assumption seems to be that the outlook in the constitutional psychoses is either for recurrence, chronicity or deterioration. Permanent recovery does, however, occur, probably more often than has been generally supposed. The authors were successful in securing data concerning the after-histories of eight cases, and their inquiry showed that their former patients had attained late middle life, and had been free from psychoses for periods of from thirty-one to forty years.

R. M. S.

- [194] Relation of puberty to behaviour and personality in patients with dementia præcox.—CHARLES E. GIBBS. *Amer. Jour. Psychiat.*, 1923, iii, 121.

CASES are reported in which a definite change in personality appeared at puberty, the actual psychosis developing later. Most of the cases also gave a history of rapid growth or other disturbance of metabolism at puberty. The relation of puberty to psychopathic behaviour is discussed. In certain cases of dementia præcox it is difficult to determine whether seclusive behaviour appearing at puberty is a part of the personality or a part of the psychosis.

C. S. R.

- [195] The mental health of 581 offspring of non-psychotic parents.—M. M. CANAVAN and ROSAMUND CLARK. *Mental Hygiene*, 1923, vii, 770.

1. DATA on 581 children, the offspring of 145 matings of non-psychotic parents, were collected from the Medical Out-Patient Department of the Peter Bent Brigham Hospital, Boston.

2. The parents were comparable to the parents in the dementia præcox study (see this JOURNAL, 1923, iv, 76) in economic levels, nativity, and number of children per mating.

3. There were available data on 500 living children. Of these, 145 deviate from the normal either mentally, physically, or socially. The deviations are: 1 dementia præcox, 1 pre-præcox, 10 feeble-minded (one with convulsions), 12 backward, 12 nervous, 8 cases of conduct disorders, 101 physically diseased. One hundred children were under and forty-five over sixteen.

4. The death rate of the non-psychotic offspring is lower than that of the dementia præcox issue, and considerably lower than that of the epileptics.

5. The conduct disorders, though of the same types in the two groups, are eight out of 500 for the non-psychotic offspring, thirty-six out of 381 for the offspring of dementia præcox parents. The number of backward and nervous is the same among the non-psychotics as among the dementia præcox cases, though the percentage is less in the former group. The greater number of physically diseased among the children of the non-psychotics is hard to explain.

6. One undoubted case of dementia præcox was found. One other was of præcox type, though the patient partly earns her living.

H. M. R.

NEUROSES AND PSYCHONEUROSES.

[196] Depressive states and neurasthenia (*Les états dépressifs et la névrasthénie*).—M. DE FLEURY. *Presse méd.*, 1923, iii, 581.

In this article the author commences by an eloquent plea for greater accuracy in the clinical description and diagnosis of states of depression. He rightly complains of the frequency with which neurologists, and even psychiatrists, confuse destructive depressed states, grouping such clinical conditions as the depression of the manic-depressive psychosis, hypochondriasis, and anxiety neurosis under the heading of neurasthenia. Fleury proceeds to the description of the mental state of four patients, two manic-depressives, a hypochondriac, and an anxiety neurotic, and points out that their resemblance to a true neurasthenic is very superficial.

Neurasthenia he believes is a rare disease. He finds the literature of the subject is full of erroneous etiology. Emotional shock, overwork, anxiety, loss of sleep, and various forms of trauma are almost invariably given by authors as the principal causes of neurasthenia. Fleury, in four years of work among soldiers suffering from war neuroses, found true neurasthenia to be present in only 100 out of 6,000 to 8,000 patients. Yet, as he points out, considering the exposure of millions of men to war conditions, one would expect to find large numbers of neurasthenics, in view of the emotional stress, fatigue, and loss of sleep associated with life in the trenches. Fleury believes that neurasthenia is essentially a physical condition, and that the mental signs are secondary. He points out that the condition is frequently seen in arthritic subjects. Arterial hypotension is common; the gastro-intestinal system generally shows habitual constipation associated with gastropptosis and enteroptosis, and hyposecretion of the gastric and intestinal glands. There is loss of sexual appetite, and coitus is followed by extreme fatigue and depression. Sleep is delayed and unrefreshing. Vertical and occipital headache is common and frequently associated with pain in the back of the neck and in the lumbar region.

Fleury lays stress on the appearance of the above signs and symptoms long before mental disabilities appear. Physical fatigue and loss of energy accompany them. The characteristics of the mental state are: depression, slight retardation, instanced by increasing difficulty in doing intellectual work, a tendency to indecision, and general mental inertia.

The author says little of treatment, but maintains that it should be mainly directed to the physical state, when general improvement follows. Psychotherapy may be a useful aid in the later stages of the cure.

G. W. B. JAMES.

[197] The psychoneuroses: their nature and treatment.—AUSTIN FOX RIGGS. *Amer. Jour. Psychiat.*, 1923, iii, 91.

HAVING discussed and discarded old theories, the author adopts the conception that the problem of the psychoneuroses is the problem of the maladaptation of intrinsically normal individuals to what in the vast majority of cases proves to be an environment also well within normal range. A short survey

of the problem of adaptation leads the writer to his main subject. The immediate exciting cause of a so-called 'breakdown' can be found in the environment. The inability to adapt to the common changes (social) of environmental conditions manifests itself in different ways, according to the individuality of the patient, and is due largely to misinterpretation. There is evidence that the psychoneurotic tendency is most often acquired, for generally satisfactory adjustment is brought about by insight. It is not probable that an organic abnormality could be so easily overcome. Psychoneurotic adaptation shows a tendency to short circuit on the instinctive level. The specifically characteristic tendencies of the psychoneurotic individuality are roughly (1) oversensitiveness to emotions and sensations; (2) relative unbalance of instincts; (3) suggestibility; (4) character faults. These are found in the normal, and it is only when they become exaggerated or relatively unbalanced that they constitute psychoneurotic tendencies. A tendency to overmobilization of energy, irrespective of need, is the commonest form of inefficiency exhibited by all types. Treatment is that of re-education, being based on the nature of the disorder and on the personal equation. Readjustment to full usefulness must be held as the primary goal—not mere immediate comfort. The insight gained should obviate recurrence. Temporary removal from home environment is often necessary. The author demonstrates his good therapeutic results by some statistics involving 800 cases.

C. S. R.

[198] **Delinquency and mental defect (I).**—W. NORWOOD EAST. *Brit. Jour. Med. Psychol.*, 1923, iii, 153.

IN this paper East discusses certain criminal actions associated with mental deficiency. In dealing with criminals, individual consideration is essential. The number of mental inefficients among the prison population is estimated at about 5 per cent. In prison work the diagnosis of mental defect may be extremely difficult. Although the nature of the offence forming the actual charge may have no diagnostic value, the method and circumstances with which it is associated are frequently important. It is probable that in defective delinquents acts of dishonesty are liable to appear at an earlier age than other criminal actions. Two classes of mental alienation are recognised in criminal law: dementia accidentalis and dementia naturalis or absence of understanding from birth. Difficulties in diagnosis due to malingering may be due to the ordinary criminal assuming mental defect or to the mental defective assuming normality. In prison work the most difficult cases to diagnose are those of a mixed mental deficiency and insanity. In these combined cases the defect does not influence the responsibility of the accused, whereas the insanity may. When working out the mental age of a patient by intelligent tests the author finds that if there is an abrupt ending to correct answers at, say, nine years, one is probably dealing with defect; if further, for a year or two after, an occasional test is answered satisfactorily, it is a case of defect; but if the occasional correct answer extends to the late years of the test series, acquired mental disorder or malingering is suggested. In the author's experience moral imbecility is rarely met with

in prison, the diagnosis being more difficult than in any other form of mental deficiency. As regards the differential diagnosis between the habitual criminal and the moral imbecile, it is of fundamental importance to recognize that the moral imbecile does not take elaborate precautions to hide his crime or avoid punishment. The paper is illustrated by some very interesting reports of cases.

ROBERT M. RIGGALL.

[199] Delinquency and mental defect (II.). CYRIL BURT. *Brit. Jour. Med. Psychol.*, 1923, iii, 168.

The phrase 'mental deficiency' is applicable, not only to defect in intelligence, but also to defect in temperament and character. The importance of intellectual deficiency in crime has been exaggerated. Burt finds 7 per cent. of his cases of juvenile delinquency mentally deficient. After puberty more girls than boys are defective and delinquent, but before puberty the condition is commoner in boys. Special classes for the backward child would result in immense diminution in crime. In considering deficiency in character, Burt agrees with East that in moral imbecility there may be no intelligence defect. He disagrees with the popular medical and legal opinion, which assumes the existence of an innate moral sense, and believes that morality is acquired after birth by slow and painful processes. Character is founded on innate tendencies, but in itself is not innate. If moral deficiency is simply a special variety of mental deficiency, it is superfluous to define the moral imbecile separately. Although morality is not inborn, it rests upon an inborn basis which is congenital and predisposes the child to immoral habits. All activities constituting crime spring from natural instincts. Burt uses the term 'temperamental deficiency' to denote an extreme degree of emotional instability due to inborn factors. He prefers to use this term instead of 'moral imbecility,' and proposes the following criterion: "A temperamental defective is one who, without being defective also in intelligence, exhibits, permanently, and from birth or from an early age, less emotional control than would be exhibited by an average child of half his chronological age; or, in the case of an adult, of the age of seven or less." With this criterion about 9 per cent. of Burt's delinquent cases would be classified as temperamentally defective, the law-abiding population showing under 1 per cent. Milder degrees of temperamental instability were seen in 34 per cent. of these cases; 19 per cent. were markedly repressed. Adolescent instability occurred in only 2 per cent. All four contributors to the symposium agree that delinquency is more than a mere matter of defective intelligence. The proportion of intellectually defective cases among the delinquent population is far lower than earlier investigations maintained, the true proportion being nearer 5 per cent. than 50. As there is no inborn moral sense, there can be no inborn moral defect. In most cases inadequate intelligence is combined with excessive emotional instability, but in a few cases the latter condition exists without intellectual retardation.

ROBERT M. RIGGALL.

- [200] **Delinquency and mental defect (III.).**—F. C. SHRUBSALL. *Brit. Jour. Med. Psychol.*, 1923, iii, 179.

IN 1922, 1.3 per cent. of the school-age population of London was mentally defective. Delinquents show a slightly greater average intelligence than the mass of day special school children in the mental defective schools. In adults the average mental age of defectives is 7.9, and of defective delinquents, 8.5. In a percentage frequency of different offences, wandering provided the maximum number of cases, showing a low grade of mentality. Shrubsall agrees with East's observation that women charged with soliciting show a relatively high mental age for defectives. As for men, stealing is more frequently found among the unemployable classes, while, in women, the largest figure is for those in regular work. The author thinks that Burt's definition of 'temperamental defectives' rather than moral imbeciles would only include those with the unstable emotional temperament. In the true moral imbecile the defect is not so much lack of inhibition as lack of feeling, the emotions being too neutral.

ROBERT M. RIGGALL.

- [201] **Delinquency and mental defect (IV.).** W. H. B. STODDART. *Brit. Jour. Med. Psychol.*, 1923, iii, 188.

DELINQUENCY refers to the tendency to commit crimes and not to the misdeeds themselves. Morality is simply the control of instincts, and is responsible for the Freudian conception of repression. Idiots and low-grade imbeciles have less control of their instincts and are more immoral in the widest sense than normal children. On the other hand, the moral tone of high-grade imbeciles and backward children is equal to or even in advance of normal children of their own intellectual mentality. This is a strong argument against the existence of 'moral imbecility,' which means innate delinquency with little or no intellectual defect. In progressive degeneration of the nervous system the control of the instincts is lost in the reverse order of its evolution, the last control to come being the first to go. Stoddart considers that the usual misdeeds of the child have an unconscious sexual meaning. The objects stolen or destroyed have a phallic or womb symbolism. In the author's experience the thefts are invariably related to the castration complex. Destructiveness symbolizes sadistic attacks on the mother. Delinquency may be a psychoneurosis occurring in an intellectually normal child, curable by psychoanalysis. In Stoddart's experience, psychoneuroses are chiefly found among the educated intellectual classes.

ROBERT M. RIGGALL.

PSYCHOPATHOLOGY.

- [202] **Literature and the psychopathic.** —N. A. CRAWFORD. *Psychoanalytic Review*, 1923, x, 440.

THE author states that two reasons explain the continued interest and charm of legend: it follows taboo and it practically always includes magic. The human race, especially the female members, cling to magical explanations,

while scientific advance has scarcely touched them. Popular literature of the present day acts in a similar way, upholding taboo and, like magic, mistaking an ideal connection for a real one.

As a rule, popular fiction appeals to the adult and legend to the child, because the latter is the more primitive. The large sale of books of etiquette shows the reliance of the popular mind on established beliefs. The parallel is drawn between the public with a taste for popular literature and the psychopathic patient. Both are upholders of taboo and both believe in magic. The psychopathic does not realize the purpose of his psychopathy nor the fiction devotee the mental state that enables him to enjoy such literature.

Modern realistic literature clearly reveals the meaning of common artistic symbols as they are found in dream life, literature and legend. It also shows that the customary repressed life is frequently psychopathic and does not lead to happiness and freedom. Sexual understanding is sure to come into conflict with popular beliefs, fears and taboos, because these latter are, for the most part, based on error. This type of literature is rejected as immoral for the above reason.

Art is all creative: it is a form of sublimation, and the reader of a novel must follow the writer in this act of sublimation. This the psychopathic and the public have an aversion to do. They do not desire to have their illusions dispelled. This may also account for the common man's objection to the arts.

DAVID MATTHEW.

[203] The nature of autosuggestion. ERNEST JONES. *Brit. Jour. Med. Psychol.*, 1923, iii, 194.

Dr. JONES opens his paper with an attempt to come to some understanding as to what are the essential characteristics of suggestion in general. He shows that three processes are involved: (1) emotional *rapport*, (2) concentration upon a given idea with inhibition of contrary ideas, (3) free development of the suggested idea. Now two schools have sprung up, depending upon a difference of opinion as to the way in which *rapport* operates. The one—heterosuggestionist—lays stress upon the part played by the operator; the other—autosuggestionist—considers the essential thing to be the attitude of the subject. In practice, however, it is by no means easy to draw a sharp distinction between the two: indeed, their relationship is so intimate as to render it probable that the operative agents are merely variants, not distinct forces. The one point of difference is in respect of the idea upon which concentration takes place. With heterosuggestion the idea is the father-imago, with autosuggestion the idea is the actual self. Dr. Jones here discovers the nodal point connecting the two: both are reanimations of narcissism, but heterosuggestion proceeds *via* a hypereathesis of the father-imago and the ego-ideal, while autosuggestion reaches back to the primary undifferentiated narcissism of the infant. Thus, the question whether most heterosuggestion is really autosuggestion, and *vice versa*, is of small importance, since the essential agent in both is narcissism, and the difference consists only in the method by

which this is activated. It would appear that, practically, it is easier to mobilise narcissism by means of heterosuggestion than directly by autosuggestion, and that the former is generally a phase passed through in the attainment of the latter. Successful autosuggestion presupposes harmony between the narcissism of the ego-ideal and that which has remained attached to the real ego. The difficulty in most cases, however, is precisely a lack of harmony between the two. Finally, Dr. Jones considers the therapeutic significance of the thesis he advances. All possible means of dealing therapeutically with the neurotic situation are reducible to two only. Either the libidinal energy of the impulse can by suggestion be reconverted into the narcissism whence it proceeded, or else the assimilative capacity of the ego-ideal can be raised and the patient's narcissism be diverted into more developed forms of mental activity; the latter is the aim in psychoanalytical treatment. These alternatives are mutually contradictory, and it is, therefore, fundamentally impossible to combine them.

ALFRED CARVER.

[204] From psychoanalysis to psychosynthesis. PAUL BIERRE. *Psychoanalytic Review*, 1923, x, 361.

MENTAL disintegration is the outstanding feature and symbolization the individual mark of mental disorder. Therefore psychosynthesis is the logical cure. Psychoanalysis is the necessary forerunner of psychosynthesis. Psychoanalysis fails because of the process of petrification or mechanization of the symptoms, i.e., after the obsession or other symptom has been analysed into its elements of childhood impressions, it still continues to whirl relentlessly in the brain.

Neurasthenia, hysteria, lunacy and dementia are forms of spiritual death. Spiritual healing requires a universally human and philosophical substructure if it is not to remain suspended in the air. This appears to be what the author means by psychosynthesis.

The healing power of nature is remarked upon in the psychical as well as the physical spheres. During sleep, as a rule, a psychosynthesis actually is brought about which involves a spontaneous healing. The part psychoanalysis has played in enabling us to interpret dreams is recognized, but the wish theory of dreams is rejected. In its place the author presents the theory that dream-formation, like the creation of the artist, is a process of psychosynthesis in the proper sense—a dissolution of contrasts into a new vital factor. This factor is the creation resulting from inspiration. Symbol-formation is defined as the conversion of allness into oneness. It is the healing power of nature in the psychical sense.

The presumed failure of psychoanalysis is held to be due to the failure to appreciate the dynamic aspect of symbol-formation.

Two examples of the author's symbol-interpretation are given: A fear of heights symbolizes a desire to rise in the world. A dream in which a married woman discovers that a stone has fallen from her ring is interpreted as follows: The stone represents the troubles of the patient, e.g., matrimonial dread, etc. The ring is the symbol of marital fidelity and the high standard of life set by

its previous owners. The dream symbolizes the patient's relief from her troubles—her cure. The weight has fallen out. This healing is produced by intellectual clarification.

After reading this article we are not surprised that the author finds it necessary to supplement his analysis. He does not appear, whatever his technique, to carry the analysis far enough to disclose the fundamental conflicts.

DAVID MATTHEW.

[205] *Psychoanalysis and pedagogy.* A. MAEDER. *Jour. of Sexology and Psychoanalysis*, 1923, i, 364.

It has been established that two powerful spheres of influence are involved : the influence of the teacher's unconscious on the pupil, and that of the pupil's unconscious on the teacher. In judging a child's talents there are two factors to be considered : a *static factor* (disposition) and a *functional factor*. Only by a laborious conquest of the negative transference by means of psychoanalytic treatment, in an example quoted, was it possible to bring out the utilization of a boy's natural gifts in behalf of the neglected subjects. This negative complex has not only a great individual significance, but also a social significance, inasmuch as it tends to infect or intensify the negative complex of other pupils. The pupil studies the teacher from all angles and soon finds his weak spots : he takes advantage of these to triumph over the person in authority, especially if the youngster has a negative father-complex. One's complexes make one blind. This applies to the teacher also. The teacher, who is himself equipped with a strong negative complex, cultivates that complex in his pupils. A teacher should be free from psychic dissociations. There is a natural 'urge' in the child for guidance, and this normal positive father-transference should be utilized by the educator as a power. The teacher must be acquainted with these natural forces and know how to guide them properly. We are really complying with an inner requirement when we give the child proper guidance. At present, psychoanalysis seems to offer basic data towards the solution of two important questions in pedagogy. The psychoanalytic viewpoint gives us the explanation for the true relations between teacher and child, and it also reveals to us an important aspect of the psychic evolution of the child and its natural requirements—knowledge which gives us guiding lines for the science of education.

C. S. R.

[206] *Stuttering and anal eroticism.*—S. A. TANNENBAUM. *Jour. of Sexology and Psychoanalysis*, 1923, i, 419.

THE author states that experience proves that in actual practice stuttering is no more easily curable now than it was in the past, and that in this it does not differ from other severe psychoneuroses. He gives excerpts from the opinions of R. Brun, who recently reported on the analysis of two cases of severe habitual stuttering and who regarded the condition as a peculiar form of compulsion-hysteria. These youths of eighteen and twenty, respectively, both traced their neurosis back to their fourth year of life. Brun states that

they both manifested a high degree of anal eroticism in early childhood, that direct anal erotic activities were repressed; in its place there appeared a strikingly strong tendency to coprolalia as a substitute-gratification. This, too, was in turn subjected to repression which, however, only succeeded incompletely, i.e., there now ensued the neurotic symptom-formation, viz., stuttering, which proved to be a typical compromise between two impulses. This analyst further stated that in both cases the symptom completely disappeared after the unveiling and disposal of the infantile anal-erotic and coprolalic experiences and phantasies. Tannenbaum considers all these points, differs entirely from the conclusions drawn, and regards the analysis as having neither scientific nor practical value.

C. S. R.

[207] **Condensation and resymbolization in dream interpretation.**—GEORGE STRAGNELL. *Psychoanalytic Review*, 1893, x, 431.

THIS is a fairly orthodox interpretation of a dream, and is of special interest because of the author's endeavour to facilitate the explanation by a series of diagrams composed of circles and lines. The value of these diagrams must be left to the reader's own judgment.

D. M.

[208] **Transference and sex.**—L. D. HUBBARD. *Psychoanalytic Review*, 1923, x, 453.

THE author summarizes the article as follows:

The sex of the analyst is an important factor in determining the nature of the transference, upon which depends the success of the analysis.

Those patients having a pronounced homosexual trend make good transfers to analysts of the same sex.

Patients showing marked heterosexual trends do best with analysts of the opposite sex, provided the transfer is tactfully handled and not allowed to become erotic.

The dominating trend may be determined in most cases by a careful study of the history.

A change of sexual trend in the course of the analysis is not often a source of danger, because it is usually a modification of the original balance, though in some cases it may be a marked change indicating recovery.

DAVID MATTHEW.

Reviews and Notices of Books.

The Common Neuroses : Their Treatment by Psychotherapy. By T. A. Ross, M.D., F.R.C.P.E., Medical Director, Cassel Hospital for Functional Nervous Disorders. Pp. 256. 1923. London : Edward Arnold & Co. Price 12s. 6d. net.

It is pleasing to find a common subject treated in an uncommon way. In these days it is surely unusual to meet with a manual of psychotherapy that is not saturated with Freudian doctrine and practice, although the author is well aware of the advantages of Freudian method on occasion. There were brave men before Agamemnon, and able psychotherapists before Freud. Not one of the least of the merits of this book is its insistence on the value of methods elaborated long before the war by workers whose names seem less prominent than they were. Dr. Ross adopts an eclectic attitude, but it may be said that his method of choice is based on the 'rational' psychotherapy of Dubois (whose name, curiously enough, we do not appear to have noticed in the book) and of Dejerine. Like the latter, he makes of his patient *un peu un ami*. For the great majority of cases technique of this character proves satisfactory. It is undesirable to wield a hammer to crack a nut—though many seem to forget the wisdom of this. For any disease that is common, simple and easily applied methods are required. The neuroses are common enough : why should their treatment necessitate year-long *séances* ?

Dr. Ross's volume is written in a strain of shrewd common sense, and is permeated by the thinking of a mind which is more practical than theoretical. By far the greater part is taken up with the treatment of neurasthenia—a morbid state which the author hesitates to define with conviction, but considers is caused by "overaction in the attempt to meet" the difficulties of life. That is, the cause is 'faulty adaptation'; the symptoms are somatic and mental, with fatigue in the foreground of the picture. If we inquire, why this overaction ? we are met with the confession that it is the expression of an "unknown factor of great determining power," viz., constitution or diathesis, which is inborn or hereditary. It is admitted that the 'make-up' of the neuropath is not that of the majority of men. If neuropaths are born and not made, the ground for treatment is no doubt cleared, but is the latter thereby facilitated ? Can the Ethiopian change his skin ? In view of the excellent results apparently obtained by Dr. Ross, with his combination of psychical and physical treatment (though he seems somewhat to depreciate employment of the latter, in spite of the fact that, on page 179, his patient is still left lying in bed), we naturally wonder whether

the acquired factors are not at least as important as the innate. Curiously, as we think, Dr. Ross minimizes the significance of the physical agents in the production of 'nervous breakdown.' We do not find any adequate appreciation of the proven fact that much of the asthenia of neurasthenia is 'suprarenal asthenia,' amenable to treatment along endocrinological lines. He seems to get somewhat entangled in his own views of fatigue, for it is regarded at one time as a cause, at another as a symptom. Dr. Ross doubts whether a "lowered potential of nerve energy can last for months or years," causing neurasthenic symptoms over a prolonged period, and holds that physical fatigue "is a thing that is recovered from quickly." We cannot agree with him here: we are convinced, on the contrary, that persistent physical fatigue may result from persistent underaction of glands, that it may continue for years, and be permanently relieved by appropriate glandular therapy. Because a fatigue state is not cured by rest, it by no means follows, as Dr. Ross maintains, that its cause is psychical. A patient with glandular underaction may rest ever so long, but the cause will remain unaffected by that rest.

One of the many interesting parts of the book is the author's apologia, as it were, for the change in orientation which twenty years' experience has given him. Beginning as a convinced 'Weir-Mitchell-ite,' he has developed into a 'faith healer' in the genuine sense. The sheet anchor of his treatment is faith and hope. He believes that the endocrine "successes which are quoted at present must be considered as having been achieved by the same means as those employed by the gynecologists of old, the means of faith in a method." True to this conception, Dr. Ross maintains that in cases of impotentia coeundi physical methods (e.g., aphrodisiac drugs) do good merely by restoring confidence to the patient. We think that in these and similar instances the author is unintentionally a little unfair. We accept the results equally with him: we do not accept his interpretation of the mechanism.

Dr. Ross should not, we would remind him in a friendly spirit, discuss the differential diagnosis of 'organic' and 'functional' at all unless in a thorough-going way. His criteria (page 206) are open to criticism. Many a case of "paraplegia without bladder symptoms or the tendency to bedsores" is not functional, but organic; "a spastic paraplegia without Babinski's sign or clonus is also functional," but, alas! it may also be organic; "inability to speak accompanied by fluency in writing is not aphasia," yet some organic cases show precisely this combination, as Dr. Ross's inspirer, the late Professor Dejerine, could have told him.

But what matters this and other criticism? It is long, indeed, since we have read a book on psychotherapy in which the best features in all varying methods are utilized and the unnecessary ignored, in which the technique of their practical application at the bedside is cultivated assiduously, in which, above all, the author lays himself out to discuss the actual treatment of actual symptoms. For this last reason, if for no other, the burdened practitioner owes Dr. Ross a debt of gratitude. It is a book which he who runs may read.

Psychological Types, or the Psychology of Individuation. By C. G. JUNG, M.D., etc. Translated, with an Introduction, by H. G. BAYNES, M.B. (The International Library of Psychology, Philosophy and Scientific Method.) Pp. 653. 1923. London: Kegan Paul. Price 25s. net.

THE very wide field that is covered by the contents of this considerable volume makes a critical review of the whole out of the question. In reading it, it becomes noticeable that Jung has given the barest outline of some ideas he had in mind when writing it, and has to some extent made it a task to carry further than he has hitherto done the differentiation of types, to trace their influence in history and find characteristic examples among writers and poets. The book is thus two things—a presentation of the fact that psychological types exist, and of a method of formulating them; and a narrative of certain ideas. This narrative is somewhat concealed behind the outer pageant of types. The book is difficult reading. It treads continually on the wriggling bodies of ideas, that are felt rather than seen. From the outer aspect of the book alone, the reader on finishing it might say, "Jung says there are four functions, those of thinking, feeling, sensation and intuition. Every person has one or other of these functions most developed, and the remainder subsidiary. Each of these functions can be orientated to an outward or inward goal—extraverted or introverted. He regards the problem of neurosis from the angle of types, seeing the cause of neurosis to lie in the overdevelopment of one function and underdevelopment of the others, and tracing this to the effect of civilization, that produces oneness. The therapeutic aim is to develop the undeveloped functions, so that a balance of functions is attained. Therefore, in therapeutic work we must first ascertain the type, and the main function, and then endeavour to cultivate the subsidiary and undifferentiated functions." Something like this is probably destined to become the text-book 'explanation' of Jung for future students of the psychological art. What is ironical in the situation is that this book, the soul of which breathes out an atmosphere beyond systems, must become itself a system, if it is accepted by the world. Its concluding words are: "To deny the existence of types is of little use in face of the fact of their existence. In view of their existence, therefore, every theory of the psychic processes must submit to be valued in its turn as a psychic process and, moreover, as an existing and recognized type of human psychology. Only from such typical presentations can the materials be gathered whose *co-operation* shall bring about the possibility of a higher synthesis." Such a synthesis means transcending type in oneself. The man in the street can well cry out that the psychologists can do it first. If such a thing is possible, it would be able to exist only within a limited area. This further possible extension might be the future direction of psychology.

The narrative of ideas concealed in this book first emerges closest to the surface in the chapter devoted to Schiller, and it is worth endeavouring to put them into an approximate form, as Jung describes a method which must not be passed over while psychology is so barren of methods. Schiller, brooding upon the problem of reaching freedom, and seeing it ultimately as an internal problem, discovers an antithesis of two basic instincts in himself. The

'sensuous' instinct which, with unbreakable bonds "chains the upward striving mind to the world of sense" is opposed by the 'formative' instinct, which is rational thinking. The antithesis is between rational and irrational forces. Jung regards the antithesis as between two directions that bind us on the one hand to the object and on the other to the subjective processes. The four functions that he distinguishes are not in themselves these directions, but become directed by the outward and inward acting forces, the *dynamis* of extraversion and introversion. As we exist we are quarters, or less than quarters, of what we are potentially capable of being. The psyche is quartered into sensation, intuition, feeling and thinking. Civilized life makes us onesided. Our value for it lies in our onesidedness. This man is a thinker; that a carpenter; this an artist. He is only man in this sense; in himself he is not yet man. "Outside this quarter-psyche, the other three quarters are in the darkness of repression and inferiority." This is barbarism. "Conscious capacity for onesidedness is a sign of the highest culture. But involuntary onesidedness is a sign of barbarism." Our barbarism is actual but concealed by the effect of civilization which makes us appear to be men. In ourselves we are nothing.

The antithesis, as Schiller conceived it, leads to an irresistible identification with one side or the other. To whichever of the pairs of opposites we side with we give an exclusive value, at the expense of the other. In this state there is never freedom and cannot be. What belongs to one side or to the other is in the mill of the opposites. If an orientation to a system that does not lie in the alternating systems of the opposites were possible, and the will found its content in what came out of this third system, it would work outside the influence of the mill. A third element is necessary. The will could decide, but cannot work decisively, because it must have a neutral content to work through. In our ordinary state it can find none save what is provided either by the sensuous or by the rational, each of which is a mutually exclusive instinct-force, so that the will can only go with and become lost in one or other instinct. "The will could indeed decide, but only if we anticipate the condition that must first be reached . . . it is indeed the sign of the barbarous state that the will has a onesided determination through one function; yet the will must none the less have a content, an aim." The problem becomes one that is concerned with finding an aim and content for the will to act upon that is not given by one or other of the opposing processes, because "if we allow sensuous desire as a motive of will, we act in harmony with the one instinct against our rational judgment. Yet, if we transfer the adjustment of the dispute to rational judgment" then the rational instinct acts against the sensuous. The mediate position Jung finds in the symbolic work of the unconscious. The symbol reaches the intermediate position between the pairs of opposites. It must be made the content of the will. In giving a content to the will that is not taken from life, the possibilities of a unique internal psychological movement are given. The direction of this unique movement Jung discovers to be towards individuation, and is accompanied by the gradual balancing of the functions. It will be apparent that the essence of Jung's psychological attitude lies just here.

We can tell a man who thinks too much that he should feel more, but neither we nor he has any method. It may be that he has to think still more before he can feel, but we would not know this if it were so. We cannot balance functions by external judgment. The requisite intervening process Jung does not seek from life, because life has produced the misbalance. From the critical side we may ask, if another content for the will is sought outside life and is actually found, can the content be given a unique direction past the attractive forces of the pairs of opposites that await to absorb it? The assimilation of this special material with the ordinary material must tend to increase the subjective limitations. Also, with regard to the use of the term 'symbolic work of the unconscious,' we must believe that many dreams have little or no value in this sense: that there is every kind of dream, and some special ones. Jung, however, indicates a method here, which will be mentioned below. As regards the symbol, he points out that "the rational functions are by their nature incapable of creating symbols, since they produce only a rational product necessarily restricted to a single meaning which forbids it from embracing its opposite. The sensuous functions are equally unfitted to create symbols, because from the very nature of the object they are also confined to single meanings, which comprehend only themselves and neglect the other. To discover, therefore, that impartial basis for the will we must appeal to another element where the opposites are not yet definitely divorced but still preserve their original unity. Manifestly, this is not a condition found in consciousness, since the whole nature of consciousness is *discrimination*. The separation into pairs of opposites is entirely due to conscious differentiation." The appeal to consciousness for a decision between the pairs of opposites is thus unavailing. "We must descend deeper into those foundations of consciousness which have still preserved their primordial instinctiveness: namely, into the unconscious, where all psychic functions are indistinguishably merged in the original and fundamental activity of the psyche." From this standpoint, Jung looks to the unconscious as containing the elements necessary for furnishing the will with contents that do not cause disharmony between the functions, to "that neutral region of the psyche," whose products have an intermediate value. But these products are subliminal through feeble intensity and require re-enforcement. Energy must be added to the unconscious symbol, to increase its value and bring it into consciousness. It is here that Jung outlines the existence of a method. Schiller wrote that "the inherency of the root-instincts in no way contradicts the absolute unity of the mind, provided only that man distinguishes himself from both instincts. Both certainly exist and work in him: but in himself he is neither substance nor form, neither sensuousness nor reason." The separability of an individual nucleus can lead to a differentiation of the *self* from the opposites. "This differentiation is equivalent to a detachment of energy from both sides and the disposable energy thus drawn away passes into the *self*." It is introverted into the nucleus that is separable from the pairs of opposites. This introversion means that the energy "is held with the *self* and is prevented from participation in the conflicting opposites. Since the outward way is barred to it, it turns naturally towards thought, whereby it is again in danger of becoming

entangled in the conflict. Therefore this act of differentiation of the self from the opposites, and introversion, must also involve detachment from ideas. It becomes wholly objectless: it is no longer related to anything that could be a conscious content. It, therefore, sinks into the unconscious, where it automatically takes possession of the waiting phantasy material, which it actuates and urges towards consciousness." Jung views this phantasy material thus animated in this special way as containing formulations for the psychological development of the individuality in its successive states. So far as the reviewer understands his presentation, he implies that energy separated and dealt with in this manner can rouse a specially appropriate symbol-response. The energy withdrawn from the pairs of opposites exhausts them temporarily. After a time they recuperate and the resumed conflict demands the same process. "This function of mediation between the opposites I have termed the *transcendent function*, by which I mean nothing mysterious, but merely a combined function of conscious and unconscious elements." In a footnote he observes he is only presenting this function in principle. It must be observed that the struggle between the opposites requires to become internally apparent before this method is practicable. The usurpation of the onesided function and the whole mechanical set of the sequence of psychic processes prevents this. The feelings that occur in ordinary existence are perhaps scarcely thrown into strong enough relief, or sufficiently antagonized without the aid of special environmental factors.

In the subsequent chapter upon the type problem in poetry, in which Spitteler's Epimetheus and Prometheus is interpreted, the reconciling symbol, as "a principle of dynamic regulation," is discussed, and parallels drawn with Indian and Chinese philosophy. Taking Spitteler's dramatic work as an unconscious product surcharged with a significance bearing on the present situation of civilization, which has a psychological problem as a whole, Jung reflects upon the nature of the reconciling symbol contained in the poem, which delivers humanity from the soulless moral routine into which it has fallen. He observes, from the history of redeeming symbols in general, that it must necessarily take a form that is rejected by the majority and be incompatible with all that is held in reverence. The work of the redeeming symbol is "equivalent to a great catastrophe, since a new and powerful life issues forth just where no life or force or new development was anticipated." It might be equally true to say that a great catastrophe is the condition essential for the birth of a new symbol. From where otherwise comes the energy?

The type problem in psychiatry is noticed from the standpoint of a work by Otto Gross on cell-functions. The activity of the cerebral cell is divisible into two forms of functions. The primary function is connected with the production of a psychic process, such as a representation. The secondary function, following immediately on this, is connected with the re-establishment of the state in which the primary function is again rendered possible. Intensity of affect in the primary functioning gives a prolonged secondary function. Gross considers that it leads to restriction in the choice of associations to whatever has been represented in the primary function. The question arises if, in cases where the restitution phase or secondary function is prolonged,

there may not be certain psychological peculiarities connected with this condition. A brief secondary function will influence fewer consecutive associations, and at the same time re-establish the primary function more speedily. The psychological picture in such a case would show a constant and rapidly renewed readiness for action and re-action, hence a capacity for deviation, a tendency to superficiality of associative connections and a lack of deeper, more integrated, connections. Abbreviation of the secondary function interferes with any real intellectual process, while intense prolongation of it, and pathological impeding of it, would account for the phenomenon of perseveration. Jung suggests that the introvert psychology is connected with a prolonged secondary function, but considers the affective intensity of the primary function as the decisive factor in producing this. The extravert psychology corresponds to a short and weak primary function with a transient secondary function.

The historical treatment of the type problem, which makes a difficult beginning to the book, is introduced by a passage from Heine. "Plato and Aristotle! They are not merely two systems; they are also types of two distinct human natures which from immemorial time, under every sort of cloak, stand more or less inimically opposed. But pre-eminently the whole mediæval period was riven by this conflict, persisting even to the present day. . . ." Locke thought that irreconcilable opposition between different sects of philosophy and religion has a psychological origin, and no reference to anything existing objectively in the disputes. In following the acrimonious war between the nominalists and realists in the Middle Ages, and tracing their antecedent representation in the Platonic, Megaric and Cynic schools, Jung sees the ever-renewed battle between extravert and introvert psychology, the one laying the emphasis on the object, the other on the idea. The theological disputes concerning transubstantiation are viewed in the same light. Radbertus, in the ninth century, advanced the doctrine that the wine and bread were transformed into the actual blood and body of Christ, which doctrine was opposed by Scotus Erigena, who sought only the symbolical idea. The trend of the period was concretistic and extraverted. Scotus Erigena was murdered by his own monks. There is a passage in Burnet's *History of the Reformation* in which he observes that when the doctrine of the corporeal presence was first received in the Western Church, "they believed that the whole loaf was turned into one entire body of Christ, so that in the distribution one had an eye, a nose or an ear, another a tooth, finger or toe, a third a collop or a piece of tripe." In the later controversy between Luther and Zwingli, Jung points out that Luther showed the extraverted attitude.

The latter third of the book is occupied with an extensive presentation of types in all combinations. The original extraverted and introverted types are referred to as *general attitude types*, distinguished by the direction of general interest or energy movement, and Jung adds to them the *function types*, which depend upon what the most differentiated function is in an individual's adaptation or orientation to life. He observes that nature knows two fundamentally different ways by which the living organism continues its existence: "the one is by increased fertility, accompanied by a relatively small degree

of defensive power and individual conservation: the other is by individual equipment of manifold means of self-protection, coupled with a relatively insignificant fertility." He points out that the peculiarity of the extravert in constantly spending and propagating himself in every sense, and the characteristic of the introvert in defending and conserving himself from any expenditure of energy directly related to the object, can be connected with this fundamental biological distinction. His portrayals of the various function-types are drawn with their own freshness and subtlety, and strike a different note in the book. A chapter of definitions follows, in which the technical terms used in the book are explained. In the conclusion he envisages the main trend of his investigations. Every psychological type has its own validity and sees part of the truth. The fault is, as Pascal wrote, not that we follow an error, but that we do not follow another truth. The existence of mutually contradictory theories concerning the same process is inevitable, owing to the type-problem. The only alternative is to found a sect and claim universal validity, and hold out as long as possible. The necessity for a plurality of explanation in the case of psychological theories is therefore, from his standpoint, inevitable. It must be said that this is impossible in the world, which must continue to live in hostile sects. We have to notice that psychology is beginning to pass towards a region in which the understanding of it is only possible through the experiencing of it. There is understanding that is reached only in this way, and which otherwise falls away to nothing. What is necessary for its further extension and existence becomes a problem.

Those who take the view that this richly-stored book—which is without parallel—is irrelevant to practical work or is not 'scientific' cannot have perceived the main problem that confronts the psychological sproutings that shot up so suddenly during this century.

There is an explanatory introduction by Dr. H. G. Baynes, who has also provided a good index. The translation is workmanlike and consistent.

MAURICE NICOLL.

Fisiopatologia delle Sindromi Parkinsoniane. By Dr. FEDELE NEGRO. Pp. 224. Turin: Stabilimento Lampografico. 1923. Price not given.

DR. NEGRO has written a useful compendium of the symptomatology and pathological physiology of Parkinson's disease. It is characterized by a thoroughly modern outlook in respect of such problems as muscle tone and involuntary movements, and is marked by erudition and clinical acumen. The references to the literature are up to date and numerous: but although the bibliography extends to no less than twenty-three pages, there are not a few allusions in the text to papers not specified in it.

Some forty pages are devoted to muscle tonus and about an equal number to the symptoms of Parkinson's disease attributable to tone disorder. Dr. Negro is led from his researches to suggest that there are two extrapyramidal paths concerned with tone: (1) a cerebellar-rubro-detero-spinal, and (2) a pallido-nigro-subthalamico-spinal. Pallido-nigro-rubral connections exercise an inhibitory action on tone impulses transmitted from the cerebellum to the

nucleus ruber and so by the rubrospinal paths to striate muscles (myofibrillary substance); tegmento-spinal influence regulates the tonicity of the muscle sarcoplasm.

The pathogenesis of tremor and other sorts of involuntary movement is investigated with less precision; the dyskineses are ascribed in a somewhat vague and general fashion to disturbance of the 'myostatic system,' in particular the neostriatum. The vasomotor, secretory, and trophic signs of paralysis agitans are also discussed. In spite of not a little that is purely hypothetical this monograph will repay careful perusal.

S. A. K. W.

Handbuch der Neurologie des Ohres. Bd. I., HALBTE I. Edited by Professor Dr. G. ALEXANDER, Professor Dr. O. MARBURG, and Dr. H. BRUNNER. With 198 illustrations and 12 plates. Pp. 699. 1923. Berlin and Vienna: Urban and Schwarzenberg. Price not stated.

THIS is the first instalment of what promises to be an encyclopædic treatise on the ear and all that pertains to it. The volume is beautifully printed and the numerous illustrations, coloured and otherwise, are clearly reproduced. For the neurologist it contains a vast amount of information of notable present-day interest. Thus the editors are fortunate in having been able to obtain contributions from such acknowledged authorities as Professor Magnus and Dr. de Kleyn on the experimental physiology of the vestibular apparatus, from Dr. Dusser de Barenne on cerebellar function and neuropathology, from Professor Karplus on the physiology of the same organ. The anatomy of the eighth nerve and its cerebellar and cerebral connections is dealt with exhaustively by Professor Marburg. The anatomy and physiology of the outer, middle, and inner ear, tone psychology, vertigo, are among other topics described at length.

No one can glance through this fine production without being impressed alike by the width of the field of medicine enclosed within the limits of the 'ear,' and by the minuteness of detail with which the presentment of the various subjects is made.

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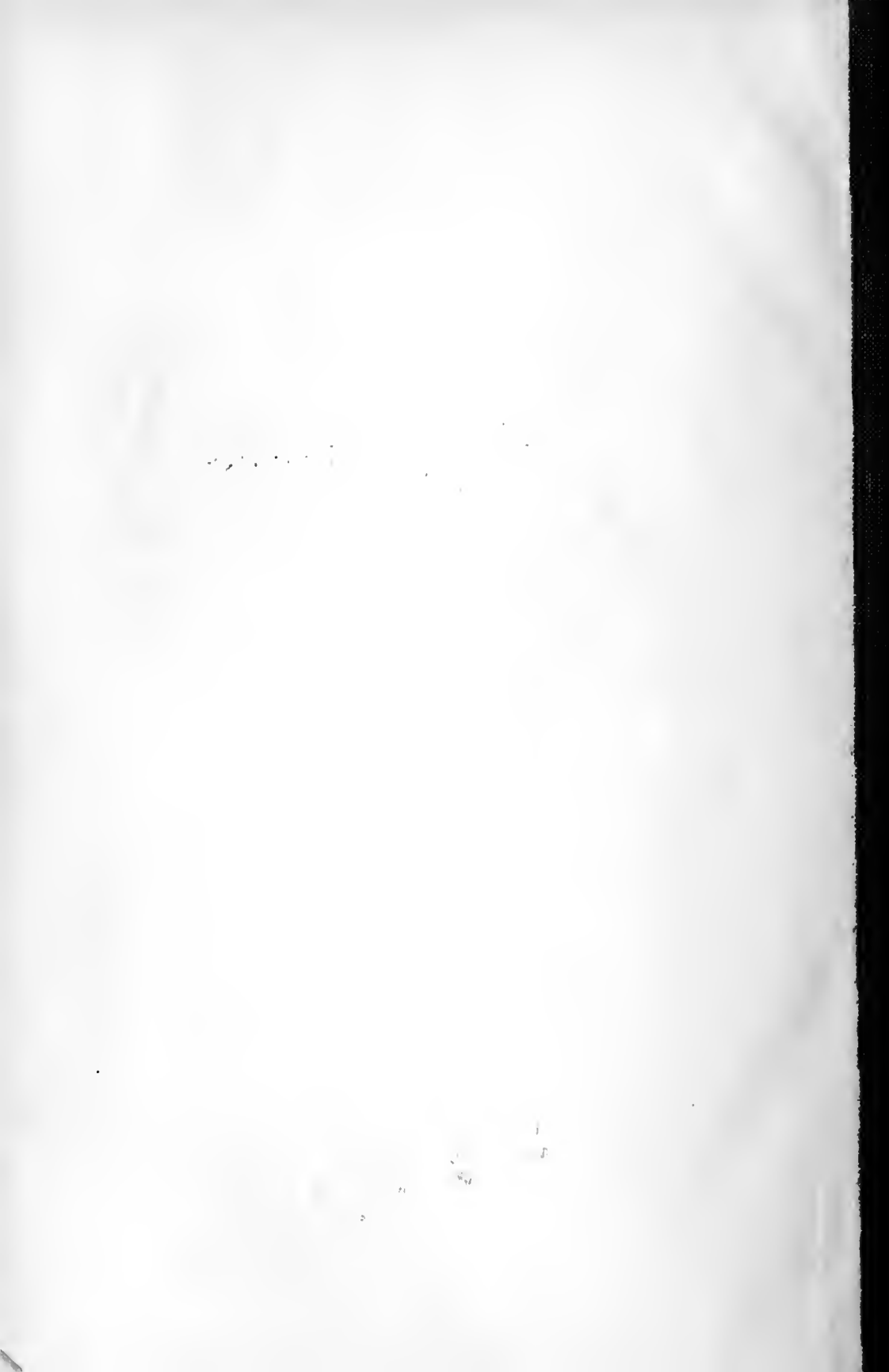
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